POPULAR SCIENCE

MONTHLY

MECHANICS AND HANDICRAFT

January, 1951 · 25¢

Is Your TV Put Up Right? – p.169

How Deadly Are the Russian Jets?

PAGE 90

GIVE YOUR HOUSE THAT DREAM HOME LOOK

.. from Cellar Right Up to Attic!

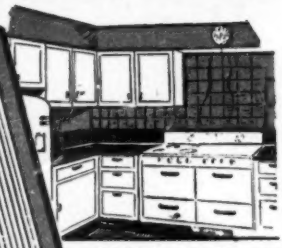
For Free Trial of this De-Luxe THUMB-NOTCHED Edition, check DeLuxe paragraph in coupon.

FREE! 7 Days Trial

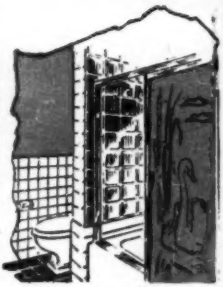
A Wise Publication

Amateur Builder's HANDBOOK

Hubbard Cobb



You'll be the hero of the hour when you build this Streamlined Kitchen every woman dreams about, with the help of this book!



You can easily grace your home with a modern, stunning Hollywood Bath!

MORE THAN 1,000 "How-to-Do-It" Pictures!
(Charts, Tables, Sketches, etc.)
300,000 Words, 512 Pages of Room-by-Room Ideas
by Famous "Handyman"
Hubbard Cobb

Ideas on using glass blocks to give rooms glamor, better lighting!

9 Books in ONE!

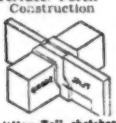
1. Concrete, Masonry, Bricks, Glass
2. Rough Carpentry, Houses, Rooms
3. Millwork, Windows, Doors, Screens, Floors
4. Roofs, Insulation, Ventilation, Heating
5. Interior Finish, Plaster, Linoleum, Tile, Wallpaper
6. Plumbing, Heating, Fireplaces, Chimneys
7. Tools, Hardware for Your EVERY Need
8. Paints, Varnishes, Sprayers, Brushes
9. Electrical Wiring, Fixtures

and Many Other Features!

Here Is a Mere Glimpse of Immense List of Contents:

1001 Money-Saving Ideas on EVERY Phase of Home Improvement Show How YOU Can Have the Luxury Home You've Longed for!

Woods for Exterior Trim
Woods for Porches
Woods for Interior Trim
Woods for Siding
Rafters Layout Terms
Repairing Interior Walls
Terrace, Porch Construction



"How-To" sketches show you EVERY type of joist you'll ever need!

MILLWORK, WINDOWS, DOORS, SCREENS, FLOORS

Floors—Nailing, Laying, Finishing
Edgings, Doorways
Storm Windows, Doors
Shelves, Cabinets
Adjusting Doors, Built-In Furniture
Bathroom Cabinets
Closets, Working Bins

Joining Roof to Walls

ROOFS, INSULATION, VENTILATION, FLASHING

Installing Flashing—Diagrams, Instructions, Valleys, Chimneys, Hips, Windows, Doorways, etc.
Types of Insulation
Insulating Farm Buildings
Types of Shingles, Walls, Roofs, Hips, Ridges, etc.
How-To, How-Not-To Ideas
Tips on Repairing, Replacing
Leaks in Old Roofs
Roofing, Instructions

PLASTER, LINOLEUM, TILE, WALLPAPERS

Tileboards
Repairing Walls
Tile-Laying Tips
Wall Plaster Mixing
Exterior and Interior Walls
Door, Window Openings, Trims
Wall Board Installation

You get countless wiring facts such as installing outlets, even in concrete!

Linoleum Laying
Lifetime Wall Coverings
Repairing Ceilings
Installing New Ceilings
Making Rooms Seem Larger, Wider
Installing Ceiling Panels

HEATING, PLUMBING, CHIMNEYS

Building Fireplaces
Plumbing, Pipes of All Kinds
Faucet Installations
Coal Bins, Construction
Fixtures, Tubs, Sinks, Showers
Saving on Fuels
Duplex Bathrooms
Chimney Construction
Hot Water Systems
Making Woods Fire-Resistant

PAINTS, VARNISHES

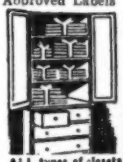
Tinting
Cleaning Paint Spots
Floor Sealers
Decorating Old Floors
Color, Decorating Tips
Types of Finish—When, Where, How to Use
Whitewashing, Ingredients
Painting Wood Floors
Paints for Brick, Concrete, Plaster

TOOLS, NAILS, HARDWARE

Scaffolds
Ladders, Use and Precautions
Sliding Windows
Latches
Screens—Repairing, Replacing, Construction, Painting, Installation
Bolts, Screws, Nails—All types and Sizes

ELECTRICITY

Switches
Individual Room Heating
Thermostats
Kitchen Outlets
Bells, Chimes
Lamps, Types, Best Placing
Low-Voltage Wiring
Approved Labels



ALL types of closets — for kitchens, bathrooms, bedrooms, etc.

PLUS ALL THESE EXCITING EXTRAS

Construction of Driveways
Repairing Garden Hose
Awnings
Landscaping
Lawn-Roller, How to Make
Moving of Heavy Items, Furniture
AND MUCH MORE!

Brick Veneer
Arches, Doorways, Partitions
Patterns in Bricklaying
Concrete Masonry Walls
Brick Facing
Concrete Steps

CARPENTRY

Lumber—Standard Measurements
Lumber Defects—How to Recognize
Roof, Nailing
Wall Bracing
Partitions, Wood
Plywoods, Fences
Stairs, Outdoor, Cellar
Kitchens—Plans and Designs

Cap Flashing, shown here, is one of hundreds of roofing features!

Amazing ALL-NEW 9-Books-in-1-Volume Helps You SAVE Many Thousands of Dollars—Increases Your Home's Value!

1001 Ideas for Streamlining Kitchens • Built-in Closets • Extra Bathrooms • Heating Systems Converting Attics & Cellars • Modernizing EVERY Room!

PICTURIZED Step-by-Step Instructions Show You How!

DON'T put off those vital home repairs and improvements another day! Whether you want a sunny Streamlined Kitchen, a cozy livable Attic Study or Playroom, a new Driveway, a cheery Indoor or Outdoor Fireplace, or ANY OTHER luxurious improvement imaginable—*all* are now within your grasp, FOR THE COST OF MATERIALS ALONE—with the aid of this amazing, *all-new* "AMATEUR BUILDER'S HANDBOOK"!

Actually, this is more than a book—it's virtually 9-Books-in-One! A whopping big volume of room-by-room instructions for completely modernizing ANY home—a complete handbook on EVERYTHING the average home-owner wants for ALL 9 handyman trades! 512 BIG PAGES—OVER 1000 "Show-How" Illustrations—OVER 300,000 clear, helpful words! Fingertip reference on 1,001 ways to save money—on fuel, insulation, plumbing, landscaping, roofing, painting, wiring—*and much more!*

Indoors or Outdoors—Cellar to Attic—Porch to Kitchen—EVERY Modern Improvement You've Ever Desired, Fully Described and Illustrated!

THE money this giant book SAVES you can provide your family with those luxuries you've dreamed of! And, at the same time, you'll be modernizing, beautifying, even building a home to thrill your wife and amaze your neighbors. Imagine building that streamlined, completely modern Dream Kitchen and Hollywood Bath every woman yearns for! Install your own Heating System—build your own Stoker Bin! See NEW ways to get longer life out of household equipment. NEW ways to save on fuel—giant Heating Section alone may save you *hundreds of dollars!*

One of 6 simple steps showing you how to get perfect re-roofing—at big savings!

Save TIME—Save MONEY in Building or Remodeling ANY House!

From fixing leaky faucets to *complete* modernization, you get all picturized directions! Step-by-step illustrations, easy-to-follow text show you how to give your family a comfortable, spacious home that will be the showplace of your town! Wallpaper your house for as little as $2 a room! SAVE up to 70% on cost of insulating! Build all types of closets and cabinets, for the cost of materials alone! Give every room better lighting—*and ever so much more!*

FREE! Full Week's Home Improvement Trial!

The minute this immense, *money-saving* volume is in your hands, you'll pitch right in on home repair jobs you've been postponing because of sky-high labor costs. You'll see for yourself how easily you can make your house a Dream Home for mere pennies, while neighbors spend dollars! Let the "AMATEUR BUILDER'S HANDBOOK" *earn* you money in a week's FREE Trial! SEND NO MONEY—just mail that Special $1.00 Discount FREE-Trial Coupon *TODAY!*

SAVE $1.00 DISCOUNT
Mail FREE-Trial Coupon NOW!

Pay Miracle Low Price of Only $2.95 if you decide to keep it!

BEFORE you even think of buying this *9-Books-in-One*, test it a full week FREE! If not convinced this amazing ALL-NEW "How-To" book will help you SAVE *at least $100.00 every year*, return it and owe nothing! Otherwise, keep it and remit—*not the $20.00 or $30.00 you'd expect to pay*—but only $1 monthly, until the miracle Discount Price of only $2.95 plus postage is paid.

But you *must* act NOW! Rising costs and paper shortages may soon compel us to go back to original planned price of $3.95. So, to avoid disappointment and enjoy full $1.00 Discount, claim your copy before it's too late! SEND NO MONEY—mail the FREE-Trial Discount Coupon TODAY!

Rush FREE-Trial $1.00 Discount Coupon NOW!

Wm. H. Wise & Co., Inc., 50 West 47th Street, New York 19, N. Y.

Without obligation to me, rush me prepaid for FREE Trial the *all brand-new* "AMATEUR BUILDER'S HANDBOOK"! 1,001 step-by-step, picturized instructions for repairing, improving and beautifying any house from cellar to attic, inside and out, for mere cost of materials alone!

After 7 days' FREE Trial, I'll return book and owe nothing. Or, if convinced this amazing 9-Books-in-1 may save me $100.00 a year *or more*, I'll keep it and remit—*NOT $20.00, NOT even $3.95*—but only $1 monthly until miracle Discount price of only $2.95 plus postage is paid.

SAVE SHIPPING CHARGES! Send only $3 now and we will stand all packing, postage and insurance costs. Same return privilege and refund guaranteed.

MR. / MRS. / MISS 58
(Print plainly in BLOCK LETTERS)

ADDRESS 801

CITY ..... ZONE ..... STATE .....

☐ CHECK HERE to examine FREE, beautiful DE LUXE EDITION, THUMB-NOTCHED as illustrated at left for easy reference. Richly-bound in Pinseal-Grained Binding with luxurious hand-tooled design in harmonizing colors. Only $1 extra. Same return privilege and terms!

THE MAGAZINE OF NEW AND USEFUL IDEAS

POPULAR SCIENCE Monthly

Founded 1872. Vol. 158: No 1 *Mechanics and Handicraft*

Perry Githens, EDITOR

Fred O. Newman, Volta Torrey, MANAGING EDITORS Howard C. Jensen, ART EDITOR

Harry Walton, MECHANICS & HANDICRAFT EDITOR

Hartley E. Howe, Frank Rowsome, Jr., ASSISTANT MANAGING EDITORS

ASSOCIATE EDITORS: Howard Allaway, Alden P. Armagnac, Devon Francis, Richard Giovine, Robert Gorman, Sheldon Gallager, Herbert Johansen, Martin Mann, Denis Sneigr, Robert P. Stevenson.

ART DIRECTOR: Harry Samuels. ART ASSOCIATES: Herbert Anthony, Eric Karminski, Jr., Richard Meyer, Edward Hallstrom, Frances Cooper (Production).

EDITORIAL ASSISTANTS: Julia Charnif, Carol Ennis, Rita K. Gilbert, Georgette Sparks, Harriet Trowbridge, Ruth Westphal.

STAFF PHOTOGRAPHERS: W. W. Morris (Chief), Hubert Luckett, Orlando Guerra (Darkroom).

WESTERN EDITOR: Andrew R. Boone (Los Angeles).

WASHINGTON EDITOR: John F. Loosbrock.

Features FOR JANUARY, 1951

The Cover:
Russian jet power in the sky is depicted by Jo Kotula, veteran PS artist and aircraft designer.

How Deadly Are Russian Jets?.... 90
Plenty—says this revealing report that lifts the curtain on the Soviet's new air weapons.

Dredges Build a Super-Highway....106
Seagoing earth movers dig into ocean-bottom sandbanks to speed construction of turnpike.

Shaw Road-Tests '51 Pontiac.....109
Pontiac buyers will be getting a smooth ride for their money, reports Wilbur Shaw.

How Your Telephone Man Works 117
Every day 8,000 new phones ring—giving a "busy-signal" to the men who install them.

How to Tell Guns from Howitzers 124
Meet the artillery—the noise boys who work at the dirty end of war's death factory.

Quick-Print Camera Turns Pro....138
The self-developing Land camera graduates from a novelty to a self-supporting photo career.

How Your Train Stops.....143
The giant muscles of modern air brakes do the job guided by delicate mechanical nerves.

Best Ways to Mount TV Antennas 169
If you want a better picture, read these tips on how to put up your signal catcher.

Got a Damp Basement?.....175
If your cellar is all wet, get to work on your three enemies—condensation, seepage, and leakage.

Friction Helps You Drive.....187
These simple experiments show that without it your car couldn't start, keep going, or stop.

Strained Diet Saves Car Engine....193
Follow these instructions on cleaning the cleaners, and your engine will last much longer.

Bomb It with Paint.....222
Now you can do a quick and easy paint-spraying job. Here's how.

Hot Rods Play Polo..... 98
Machine Cleans Blood While You Wait..103

Godfrey Hammond, PUBLISHER · Stephen P. Glennon, ADVERTISING DIRECTOR · Edward Roeder, Jr., ADVERTISING MGR.

EDITORIAL OFFICES: 353 Fourth Avenue, New York 10, N. Y. Manuscripts and illustrations submitted at regular rates should be so marked, addressed to "The Editors" and accompanied by stamped, self-addressed envelope. Popular Science Monthly exercises all possible care but assumes no responsibility for unsolicited material.

ADVERTISING OFFICES: NEW YORK – 353 Fourth Avenue; CHICAGO—360 North Michigan Avenue; DETROIT —820 Book Building; SAN FRANCISCO—Howard Building, 209 Post Street; PORTLAND (ORE.)—907 Terminal Sales Building; CLEVELAND—328 Citizens Building; LOS ANGELES—Granada Building.

Popular Science Monthly is published monthly at 353 Fourth Avenue, New York 10, N. Y., by Popular Science Publishing Co., Inc., Godfrey Hammond, President and Treasurer; R. C. Wilson, Raymond J. Brown, Stephen P. Glennon, Vice-Presidents; F. W. Briggs, Secretary. Entered as second-class matter Dec. 28, 1918, re-entered as second-class matter July 26, 1948, at the Post Office in New York, N. Y., under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U.S.A. Copyright, 1950, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all countries participating in the International Copyright Convention and Pan-American Copyright Convention. Yearly subscriptions to United States, its possessions and Canada, $3.00 (2 years, $5.50; 3 years, $7.50); foreign countries $1 per year extra. Subscribers must notify us of change of address four weeks before next publication. Be sure to give both old and new addresses, including zone numbers. Vol. 158, No. 1.

Double the Life

of cylinders and rings with Perfect Circle's amazing new

2 in 1 chrome piston ring set!

IT'S A FACT! The new 2-in-1 Chrome Piston Ring Set is actually *two sets in one* . . . because solid chrome plating on the top compression ring and the steel rails of the oil ring assures *twice the life* of ordinary sets!

YES, Perfect Circle's 2-in-1 Piston Ring Set establishes a new high standard of piston ring performance. Whether cylinders are slightly or badly worn, tapered or straight, round or out-of-round, the new 2-in-1 Chrome Set assures genuine oil economy and sustained power for thousands of extra miles.

Your Doctor of Motors, your favorite mechanic, will respect your judgment when you request him to install a new 2-in-1 Chrome Piston Ring Set in your car.

Perfect Circle

The Most Honored Name in Piston Rings

Build A FIREPLACE

around this scientifically designed steel form which also provides circulating heat that assures perfect fireplace operation.

free folder tells how

TELLS HOW TO BUILD YOUR FIREPLACE—*Step by Step*

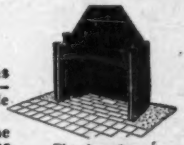
- Foundation
- Steel heat-circulating form
- Cold and warm air ducts
- Chimney and flue construction
- Mantel or decorative front

Foundation

ASK FOR BOOK "100 FIREPLACE IDEAS"

Beautiful fireplace designs modern and conventional—shows artistic use of available material.

Enjoy circulating heat and the radiance of an open fire in your *Home, Playroom, Cottage* or *Camp.*



Fireplace form set on foundation includes firebox, damper, down draft shelf and smoke dome.

Brick, stone or cement block can be used around the form.

- ☐ Send free directions for building heat-circulating fireplace.
- ☐ Send Book "100 Fireplace Ideas." Pocket size book, sent free.
- ☐ Send larger book, 8½ x 11, beautifully illustrated, 25c.
- ☐ Send outdoor fireplace folder with 10 beautiful designs Free.

Name .....

Street .....

City .....

Sold Through Leading Building Materials Dealers

PRICE FIREPLACE HEATER & TANK CORP.
192 W. Austin Street, Buffalo 7, New York

Pocket Radio Pages Doctor.....104
Undersea Camera Has Own Air, Power..114
Nature's Hot Water Piped.....122
Fertilizer Dropped from the Sky.....130
Man-Made Lumber Better and Cheaper..134
Patchwork Sports Car Hits 105 M.P.H...148
How to Stretch an Airliner.....150
Truck Cab Tips Up for Service.....154
Movies Give TV Background.....158
How to Keep the UN from Sneezing.....164
Fax Machine Cuts Mimeograph Stencil..168

Mechanics & Handicraft

Wall Desk Built in Half a Day.....173
Lathe-Sanding Stock to Thickness.....178
How to Pep Up Your Wipers.....179
Gus Tames a Runaway Engine.....182
While Your Car Is on the Grease Rack....192
Wipe-Clean Edges for Plastic Tops.....197
The Tools That Save Homes.....198
Homemade Power Sander.....203
Does Your Album Look Like This?.....206
Turn Yourself a Lighter.....209
Your Shop Can Have Direct Current.....211
Tips for TV Cabinet Builders.....216
New Tuner Adds Radio to TV.....217
Storage Units You Can Move.....219
Valance Modernizes Old Windows.....224
Keep 'Em Sharp.....228
Model-A Now Spreads Lime.....230

Departments

Letters 14
New Ideas from the Inventors.....101
Aids to Modern Living.....132
I'd Like to See Them Make.....156
Keeping the Home Shipshape.....161
Hints from the Model Garage.....185
Craftsmen at Work.....191
New Shop Ideas.....226
Mechanics of Farming.....238
New Tools 266
P. S. Last Minute News and Notes.....270

Own Your Own Flying Saucer

You don't have to be a man from Mars to ride the Flying Saucer pictured in POPULAR SCIENCE next month. It's a speedy, 75-lb. racing hull that you can build. A 7½-hp. outboard motor pushes it at 30 m.p.h. Start building it next month and it will be ready to hit the water at the first sign of warm weather.

You may serve in uniform. You may serve on the production front. But this much is sure . . . you will serve your country best if you are *trained.*

America needs *trained* men. Aircraft and engine mechanics, boilermakers, carpenters, instrument repairmen, machinists, metal workers, patternmakers, welders and other *trained* craftsmen. Men with the *training* to fill these and other skilled jobs are *scarce.*

Do you have the ambition and initiative necessary to get the training that will help you serve your country best? If you have, you can learn at home in your spare time from the International Correspondence Schools. The coupon will start you on your way.

INTERNATIONAL CORRESPONDENCE SCHOOLS

APPROVED under the G.I. BILL

BOX 7669-M, SCRANTON 9, PENNA.

Without cost or obligation, please send me full particulars about the course BEFORE which I have marked X:

Air Conditioning and Plumbing Courses
- ☐ Air Conditioning
- ☐ Heating ☐ Plumbing
- ☐ Refrigeration ☐ Steam Fitting

Chemical Courses
- ☐ Chemical Engineering
- ☐ Chemistry, Analytical
- ☐ Chemistry, Industrial
- ☐ Chemistry, Mfg. Iron & Steel
- ☐ Petroleum Refining ☐ Plastics
- ☐ Pulp and Paper Making

Civil Engineering, Architectural and Mining Courses
- ☐ Architecture
- ☐ Architectural Drafting
- ☐ Bridge and Building Foreman
- ☐ Building Estimating
- ☐ Civil Engineering
- ☐ Coal Mining
- ☐ Contracting and Building
- ☐ Highway Engineering
- ☐ Lumber Dealer
- ☐ Reading Structural Blueprints
- ☐ Sanitary Engineering
- ☐ Structural Drafting
- ☐ Structural Engineering
- ☐ Surveying and Mapping

Communications Courses
- ☐ Electronics
- ☐ Practical Telephony
- ☐ Radio, General ☐ Radio Operating
- ☐ Radio Servicing ☐ Television
- ☐ Telegraph Engineering

Electrical Courses
- ☐ Electrical Drafting
- ☐ Electrical Engineering
- ☐ Electric Light and Power
- ☐ Lighting Technician
- ☐ Practical Electrician

Internal Combustion Engines Courses
- ☐ Auto Technician ☐ Aviation
- ☐ Diesel-Electric
- ☐ Diesel Engines ☐ Gas Engines

Mechanical Courses
- ☐ Aeronautical Engineer's, Jr.
- ☐ Aircraft Drafting ☐ Flight Engineer
- ☐ Forging ☐ Foundry Work
- ☐ Heat Treatment of Metals
- ☐ Industrial Engineering
- ☐ Industrial Instrumentation
- ☐ Industrial Metallurgy
- ☐ Machine Shop ☐ Mech. Drafting
- ☐ Mechanical Engineering
- ☐ Mold-Loft Work
- ☐ Patternmaking—Wood, Metal
- ☐ Reading Shop Blueprints
- ☐ Sheet-Metal Drafting
- ☐ Sheet-Metal Worker
- ☐ Ship Drafting ☐ Ship Fitting
- ☐ Tool Designing
- ☐ Toolmaking
- ☐ Welding—Gas and Electric

Railroad Courses
- ☐ Air Brake ☐ Car Inspector
- ☐ Diesel Locomotive
- ☐ Locomotive Engineer
- ☐ Locomotive Fireman
- ☐ Locomotive Machinist
- ☐ Railroad Section Foreman
- ☐ Steam-Diesel Loco. Eng.

Stationary Eng'r'g Courses
- ☐ Boilermaking
- ☐ Combustion Engineering
- ☐ Engine Running
- ☐ Marine Engineering
- ☐ Power Plant Eng'r'g ☐ Steam Engr.

Textile Courses
- ☐ Cotton Manufacturing
- ☐ Loom Fixing ☐ Rayon Weaving
- ☐ Textile Designing
- ☐ Woolen Manufacturing

Business and Academic Courses
- ☐ Accounting ☐ Advertising
- ☐ Bookkeeping
- ☐ Business Administration
- ☐ Bus. Correspondence ☐ Bus. Law
- ☐ Certified Public Accounting
- ☐ Commercial ☐ Commercial Art
- ☐ Cost Accounting
- ☐ Federal Tax ☐ First Year College
- ☐ Foremanship ☐ French
- ☐ Good English ☐ High School
- ☐ Higher Mathematics ☐ Illustration
- ☐ Industrial Supervision
- ☐ Motor Traffic ☐ Postal Civil Service
- ☐ Retailing ☐ Retail Bus. Management
- ☐ Salesmanship ☐ Secretarial
- ☐ Sign Lettering
- ☐ Spanish ☐ Stenography
- ☐ Traffic Management

Name _____ Age _____ Home Address _____

City _____ State _____ Working Hours _____ A.M. to _____ P.M.

Present Position _____ Employed by _____

Length of Service in World War II _____

Enrollment under G.I. Bill approved for World War II Veterans. Special tuition rates to members of the Armed Forces. Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada.

I'll Train You RADIO-

PRACTICE SERVICING OR COMMUNICATIONS with Radio Kits I Send

I Trained These Men

E. J. STREITENBERGER, New Bost:n, O., sa ing course, I mad week fixing sets time. Now se Television sets

PHILLIP G. Louisville 8, K have been oper Servicing busi years I did $14 business; net p

S. W. DINWIDDIE, ville, Ill., writes, "S finishing course, wo servicing shop. No Engineer of WCUN Police Radio Instal

A. HERR, New C Pa., writes, "Hav doubled my salary since starting in Radio full time. Am employed by Station WKBO as transmitter operator. Future looks bright to me."

L. HAUGER, San Bruno, Calif., tells us, "I accepted a position as Radio and Television Technician . . . promoted to manager of Television Service and Installation."

LEANDER ARNOLD, Pontiac, Mich., says, "While learning, made $5 to $10 a week repairing Radios in my spare time. Now I have a spare time shop in my home."

NORMAN H. WARD, Ridgefield Park, N. J., writes, "4 years ago, I was a bookkeeper with a hand-to-mouth salary. Now I am employed by a key ABC station."

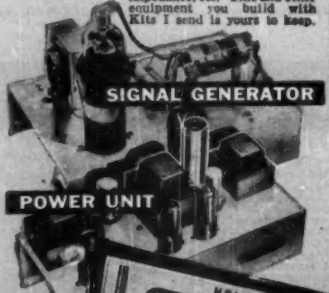
H. B. MILLS, Washington, Ohio, finds, "Word traveled fast in regard to my N.R.I. training. Have been doing Television installation and servicing, tracing out and eliminating interference, etc."

C. STAETH, Fort Madison, Iowa, informs us, "Do Radio Servicing full time in my own shop and am making more money than ever before. I owe this to N.R.I."

T. S. NORTON, Hamilton, Ohio, says, "My first job was obtained for me by your Graduate Service Department. Am now Chief Engineer, Station WQOX."

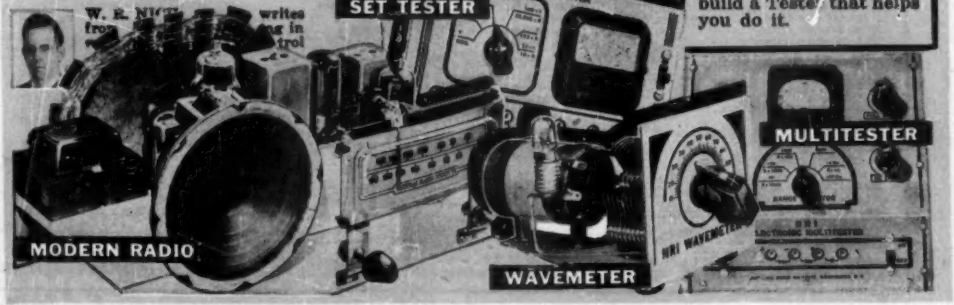
W. R. NI writes fro g in trol

For both my Servicing Course and my NEW Communications Course, I send you many Valuable Kits of Parts for PRACTICAL EXPERIENCE. They "bring to life" theory you learn in my illustrated texts. Some equipment from both courses is shown below. As part of my Servicing Course, you build a complete, powerful Radio Receiver, a Set Tester useful in earning extra spare time money, an A. M. and F. M. Signal Generator, etc. In my Communications Course, you assemble a low-power Broadcasting Transmitter that shows how to put a station "on the air," a Wavemeter, an Electronic Multitester for measuring voltage, current, resistance, impedance, etc. This and other equipment you build with Kits I send is yours to keep.



Make Extra Money in Spare Time While Learning

Many of my students earn money fixing neighbors' Radios in their spare time while learning, often average $5, $10 a week. I send you SPECIAL BOOKLETS that show you how to do it . . . and I send parts to build a Tester that helps you do it.



AT HOME for Good Jobs in TELEVISION

There is Success--Good Pay--Security for You in America's Fast Growing Industry

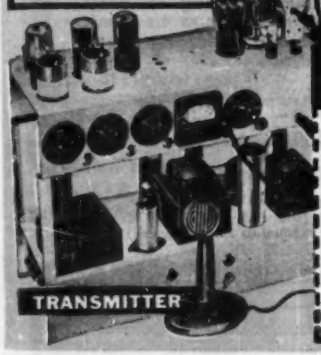
VETERANS HURRY!

To get this valuable training under G. I. Bill. Time is running out.

Mail Coupon NOW!

Want Your Own Business?

Many N.R.I. trained men operate successful Radio-Television sales and service businesses. Let me show you how, starting with spare time earnings as their capital, they build good incomes from their own shops.



Do you want good pay, a bright future, and security? Want your own profitable shop? Get into fast growing, prosperous RADIO-TELEVISION! Radio alone is bigger than ever, $1 million home and auto Radios, 2,700 Broadcasting Stations, expanding Aviation and Police Radio, Micro-Wave Relay, Two-Way Radio are making opportunities for Servicing and Communications Technicians and FCC-Licensed Operators.

Television is TODAY'S Good Job Maker

In 1950, over 5,000,000 TV sets sold. By 1954 25,000,000 TV sets estimated. Over 100 TV Stations now operating. Authorities predict 1,000 TV Stations. This means more jobs, good pay for qualified men all over United States and Canada.

No Previous Experience Needed

Keep your job while training. Hundreds of successful RADIO-TELEVISION TECHNICIANS I trained had no previous experience, some only a grammar school education. Learn Radio-Television principles from illustrated lessons. Get PRACTICAL EXPERIENCE. See on the opposite page some of the devices my students build from Kits of Parts I furnish: also practice servicing Radios or operating transmitter . . . experiment with circuits common to Radio and Television. Many of my students make $5, $10 a week extra fixing neighbors' Radios in spare time while training. Many start their own profitable Radio-Television sales and service business, using these earnings as capital.

Send Now for 2 Books FREE—Mail Coupon

Send now for my FREE DOUBLE OFFER. You get actual Servicing lesson to show how you learn at home. Also my 64-page book, "How to Be a Success in Radio-Television." Read what my graduates are doing, earning; see equipment you practice with at home. Send coupon in envelope or paste on postal. J. E. SMITH, President, Dept. 1AB, National Radio Institute, Washington 9, D. C. OUR 38th YEAR.

Actual Lesson and 64 page Book BOTH FREE

Mail Coupon Now!

MR. J. E. SMITH, President, Dept. 1AB
National Radio Institute, Washington 9, D. C.

Mail me Sample Lesson and 64-page Book, About How to Win Success in Radio-Television—both FREE. (No salesman will call. Please write plainly.)

NAME.....AGE.....

ADDRESS.....

CITY.....ZONE.....STATE.....

☐ Check if Veteran Approved Under G. I. Bill

HERE'S A READY-MADE FUTURE FOR YOU

Start Your own Business IN

ELECTRICAL APPLIANCE REPAIRING

EARN WHILE YOU LEARN

Only had your course a few short weeks and have already made $800.00. Going to quit my job paying $250.00 straight salary to operate my own business.—J. D. H., St. Louis, Mo.

Make $15.00 Saturdays and more. Am only able to operate in my spare time. It is just what a mechanical minded man needs.—G. O. F., Thomasville, Ga.

3 EASY STEPS

1. WE SEND YOU AN ELECTRONIC KIT.
2. WE TEACH YOU ELECTRICAL APPLIANCE REPAIRING.
3. WE SHOW YOU HOW TO GET BUSINESS.

WE GIVE YOU THIS ELECTRONIC KIT TROUBLE FINDER

IN YOUR OWN KITCHEN, BASEMENT OR GARAGE

LEARN at home in your spare time this fascinating big paying profession.

If you are mechanically inclined, can hold and use tools, we can give you the training and time saving kits that will enable you to . . . Command More Money At Work . . . A Better Paying Job Elsewhere . . . Or A Business Of Your Own!

New Shop Method Home Training teaches you both the technical and practical side of Electricity by having you work with your hands, Building, Testing, Repairing. All instruction manuals are written in easy-to-understand language chock full of hundreds of detailed photos and drawings. We show you how to quickly locate the trouble, how to fix it and what to charge. ALSO, how to solicit business and keep business coming to you!

$5.00 TO $6.00 AN HOUR

Often charged for making ordinary repairs. We show you how to repair refrigerators, vacuum cleaners, washing machines, motors, etc.

SEND FOR FREE BOOK!

CHRISTY TRADES SCHOOL, Dept. D-9801
4432 N. Kedzie Ave., Chicago 25, Ill.

Please send me FREE Illustrated Book on Electrical Appliance Repairing and special form for paying later from earnings.

NAME.....Age.....

ADDRESS.....

CITY.....Zone.....State.....

5 *reasons why* ACCOUNTANCY

offers you MORE MONEY . . . *and* SUCCESS!

REASON #1. If you were an expert accountant right now, chances are you would find yourself among the highest-paid of all professional men and women. Even back in "depression years," surveys showed that accountants earned more on the average than men in other major professions.

REASON #2. The demand for accountants is great—everywhere. All businesses must have trained accountants to cope with ever-growing requirements. It's a profession offering wide opportunity—always—to the man who knows.

REASON #3. You can fit into any business, anywhere in the country—because accounting principles are universal. Think what this means in terms of security and independence!

REASON #4. Accountancy is open to all. Any man or woman of good intelligence, who enjoys figure work and is willing to follow LaSalle's systematic "problem method" plan, can rapidly qualify for a highly profitable, enjoyable lifetime career . . . and he doesn't have to finish his training before beginning to "cash in."

REASON #5. Without losing a day from your present work, you can prepare in spare hours at home, at low cost, under LaSalle's step-by-step "Problem Method" of "learning by doing." This famous plan accounts for LaSalle's remarkable record of having trained nearly 10 per cent of all Certified Public Accountants in the U. S. . . . and of having put many thousands of others into high-paying careers.

Send today for LaSalle's interesting booklets, "Accountancy, the Profession That Pays," and "Success Reports." Learn about the five great fields of opportunity . . . and LaSalle's time-tested plan for helping men and women to rapid advancement, higher income, greater prestige and professional standing. The coupon below will bring these fact-filled booklets to you—without cost or obligation. Mail the coupon NOW.

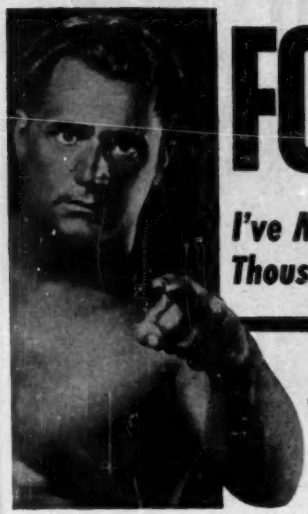
LASALLE EXTENSION UNIVERSITY
417 S. Dearborn St., Chicago 5

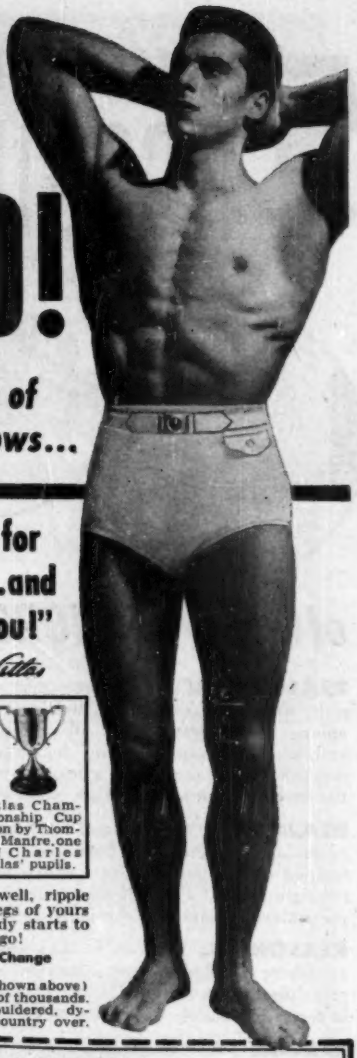
LaSalle Extension University
A Correspondence Institution
Dept. 183-H, 417 S. Dearborn St., Chicago 5, Ill.

Please send me, free of all cost or obligation, your 48-page illustrated book "Accountancy, the Profession That Pays," and the booklet "Success Reports"—send also "Ten Years' Promotion in One"—a book which has helped many men.

Name . . . . . *Age* . . . .
Address . . . . . .
City, Zone, State . . . . . .

NEW BODIES FOR OLD!





I've Made New Men Out of Thousands of Other Fellows...

"Here's what I did for THOMAS MANFRE...and what I can do for you!"

—*Charles Atlas*

GIVE me a skinny, pepless, second-rate body—and I'll cram it so full of handsome, bulging new muscle that your friends will grow bug-eyed! . . . I'll wake up that sleeping energy of yours and make it hum like a high-powered motor! Man, you'll *feel* and *look* different! You'll begin to *LIVE!*

Let Me Make YOU a NEW MAN—IN JUST 15 MINUTES A DAY

You wouldn't believe it, but I myself used to be a 97-lb. weakling. Fellows called me "Skinny." Girls snickered and made fun of me behind my back. I was a flop. THEN I discovered my marvelous new muscle-building system—"*Dynamic Tension.*" And it turned me into such a *complete* specimen of MANHOOD that today I hold the title "THE WORLD'S MOST PERFECTLY DEVELOPED MAN."

ARE YOU
Skinny and run down? Always tired? Nervous? Lacking in Confidence? Constipated? Suffering from bad breath?
What to Do About It
is told in my free book!

What is "Dynamic Tension"? How Does It Work?

When you look in the mirror and see a healthy, husky, strapping fellow smiling back at you—then you'll realize how fast "*Dynamic Tension*" GETS RESULTS!

"*Dynamic Tension*" is the easy, NATURAL method you can practice in the privacy of your own room—JUST 15 MINUTES EACH DAY—while *your* scrawny chest and shoulder muscles begin to swell, ripple . . . those spindly arms and legs of yours bulge . . . and your whole body starts to feel "alive," full of zip and go!

Atlas Championship Cup won by Thomas Manfre, one of Charles Atlas' pupils.

One Postage Stamp May Change Your Whole Life!

Sure, I gave Thomas Manfre (shown above) a NEW BODY. But he's just one of thousands. I'm steadily building broad-shouldered, dynamic MEN—day by day—the country over.

3,000,000 fellows, young and old have already gambled a postage stamp to ask for my FREE book. They wanted to read and see for themselves how I build up scrawny bodies, and how I pare down fat, flabby ones—how I turn them into human dynamos of pure MANPOWER.

MY ILLUSTRATED BOOK IS YOURS —Not For $1.00 or 10c—But FREE

Send NOW for my famous book, "Everlasting Health and Strength." 48 pages, crammed with photographs and valuable advice. Shows what "Dynamic Tension" can do, answers many vital questions. Page by page it shows what I can do for YOU.

This book is a **real prize** for any fellow who wants a better build. Yet I'll send you a copy absolutely FREE. Just glancing through it may mean the turning point in your whole life! Rush the coupon to me personally: **Charles Atlas, Dept. 1A, 115 East 23rd St., New York 10, N. Y.**

CHARLES ATLAS, Dept. 1A,
115 East 23rd St., New York 10, N. Y.

Send me—absolutely FREE—a copy of your famous book, "Everlasting Health and Strength" —48 pages, crammed with actual photographs, answers to vital health questions, and valuable advice to every man who wants a better build. I understand this book is mine to keep, and sending for it does not obligate me in any way.

Name.....Age.....
(Please print or write plainly)

Address.....

City.....State.....

WHAT Every MECHANIC Wants to Know

AUDELS CARPENTERS & BUILDERS GUIDES—(4 Book Set) $6
A practical illustrated trade assistant on modern construction for carpenters & builders, builders, mechanics and all woodworkers. 4 vols., 1600 pages, 3700 illustrations. Fully indexed, flexible covers. Each volume sold separately $1.50 a vol.

AUDELS PLUMBERS & STEAMFITTERS GUIDES—(4 Book Set) $6
A Practical Trade Assistant & Ready Reference. Explains in plain language & by clear illustrations, diagrams, charts, sketchs, pictures principles of modern, plumbing practice including Marine Pipe Fitting and Air Conditioning. 4 Vols.—1670 Pages—3648 Diagrams & Illustrations. Each Vol. Sold Separately $1.50 a Vol.

AUDELS OIL BURNER GUIDE $1
384 Pages Covering Installation, Servicing & Repairs All Types Domestic & Industrial Burners. Illustrated. Highly Endorsed.

AUDELS HOUSE HEATING GUIDE ..$4
1000 Pages Covering Working Principles, Installation, Service of All Modern House Heating, Ventilating & Air Conditioning Systems, Including New Radiant Heating. Fully Illustrated & Indexed.

AUDELS REFRIGERATION & AIR CONDITIONING GUIDE $4
New from Cover to Cover—1250 Pages, Fully Illus. Covering basic principles, service, etc., operation & repair of household, commercial & industrial refrigeration & air conditioning. A gold mine of essential facts for engineers, servicemen, users.

AUDELS SHEETMETAL WORKERS HANDY BOOK $1
Practical inside information. Fundamentals of Sheet Metal Work. 318 pages, illustrated. 11 sections. Clearly written. Essential & important facts, in everyday language. Ref. Index.

AUDELS SHEETMETAL PATTERN LAYOUTS $4
Developed by Experts for Sheet Metal Workers, Layout Men & Mechanics. A Practical Encyclopedia in 10 Sections, size 7 x 10 x 2—1175 Pages—250 Layouts—1600 Illustrations. 1001 Key Facts. Fully indexed for ready reference in answering your layout problems. Covers all phases of sheet metal work including Pattern Cutting, Pattern Development & Shop Procedure.

AUDELS BLUE PRINT READING $2
For Mechanics & Builders. Covers all types of blue print reading including ship & airplane. 416 pages, fully illustrated.

AUDELS MATHEMATICS & CALCULATIONS FOR MECHANICS $2
Mathematics for home study or reference. 700 pages, 800 illus. Practical mathematics from beginning. How to figure correctly. Easy, correct methods covering complete review. Illus. & Indexed.

AUDELS AUTOMOBILE GUIDE $4
A practical quick ready reference book for auto mechanics, service men, operators & owners. Explains theory, construction & servicing of modern motor cars, trucks, buses & auto type Diesel engines. 1700 pages, fully illustrated. 55 chapters. Indexed. A standard book for mechanics. New Hydraulic drive covered.

AUDELS DIESEL ENGINE MANUAL $2
A practical, concise treatise with questions and answers on the theory, operation and maintenance of modern diesel engines. Over 400 pages, fully illus. All details plainly brought out, this book is of extreme value to engineers, operators & students.

AUDELS WELDERS GUIDE $1
A concise, practical text on operation & maintenance of all welding machines for all mechanics. Over 400 pages, illustrated. Covers all metals & of electric and acetylene welding including airplane work.

AUDELS MACHINIST & TOOLMAKERS HANDY BOOK $4
Covers modern machine shop practice in all its branches. Tells how to set up & operate lathes, [illegible] and milling machines, shapers, drill presses & all other machine & hand tools. 1600 pages, fully illustrated. Indexed. 8 sections. 1—Modern Machine Shop Practice. 2—Blue Print Reading & How to Draw. 3—Calculations & Mathematics for Machinists. 4—Shop Physics. 5—How to Use the Slide Rule. 60 chapters. Easy to read and understand. A shop companion that answers your questions.

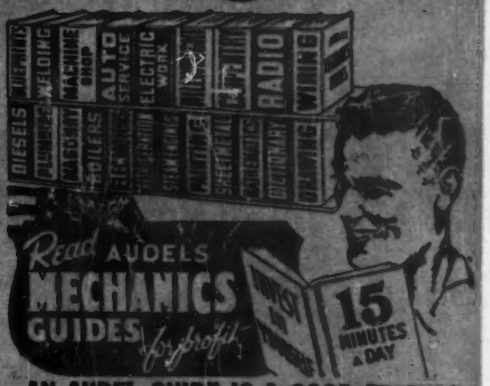
AUDELS ELECTRIC MOTOR GUIDE $4
Practical Information Covering Construction, Control, Maintenance & Wiring. Brochure of All Types Electric Motors also Armature Winding. 1000 Pages Fully Illustrated & Indexed.

AUDELS ELEC. WIRING DIAGRAMS $1
216 Pages. Illustrated. Gives practical facts on wiring of electrical apparatus. It shows clearly how to wire apparatus for practically all fields of electricity. Each diagram is complete & self-explanatory. A Highly Endorsed Pocket Companion.

AUDELS PRACTICAL ELECTRICITY $4
A key to a practical understanding of Electricity. For maintenance engineers, electricians & all electrical workers. 1440 Pages, 2050 Illus. Covers important electrical information in handy form—including wiring for Light & Power. Indexed.

AUDELS RADIOMANS GUIDE $4
A key to the practical understanding of radio including Frequency Modulation, Television, etc., Aircraft & Marine Radio. For radio engineers, servicemen, amateurs. 914 Pages, 623 Illustrations & Diagrams. Photos. Review Questions & Answers. Reference Index.

AUDEL, Publishers, 49 W. 23 St., N.Y. 10



AN AUDEL GUIDE IS A GOOD FRIEND!
Step Up Your Own Skill with the Practical Facts and Figures of Your Trade. Save time and money with right methods, short cuts, labor saving ideas. CHECK NOW! You can look over any Audel Guide in your home. Start the Easy Payments if satisfied.

Check NOW!

Audels List Of Time Tested Practical Handy Books For Mechanics That Will Answer Your Questions — Highly Endorsed

MAIL THIS TODAY

YOUR OPPORTUNITY

—CUT HERE—

MAIL ORDER

AUDEL, Publishers, 49 W. 23 St., NEW YORK 10, N. Y.

Please send me postpaid for FREE EXAMINATION books marked off below. If I decide to keep them I agree to pay $1 in 7 days on each book or set ordered and further send $1 monthly on each book or set until I have paid price, otherwise I will return them.

- ☐ MACHINISTS HANDY BOOK . . 1650 Pgs. . $ 4
- ☐ WELDERS GUIDE, 400 Pages 1
- ☐ BLUE PRINT READING, 416 Pages 2
- ☐ MATHEMATICS & CALCULATIONS, 700 Pages . 2
- ☐ SHEET METAL PATTERN LAYOUTS, 1100 Pages 4
- ☐ SHEET METAL WORKERS HANDY BOOK, 318 Pgs. 1
- ☐ MECHANICAL DRAWING GUIDE, 160 Pages . . 1
- ☐ MECHANICAL DRAWING & DESIGN, 480 Pages 2
- ☐ AUTOMOBILE MECHANICS GUIDE, 1800 Pages 4
- ☐ DIESEL ENGINE MANUAL, 575 Pages . . . 2
- ☐ AIRCRAFT WORKER, 240 Pages 1
- ☐ RADIOMANS GUIDE, 914 Pages 4
- ☐ ELECTRONIC DEVICES, 216 Pages 2
- ☐ ELECTRIC MOTOR GUIDE, 1000 Pages . . . 4
- ☐ ELECTRIC WIRING DIAGRAMS, 272 Pages . . 1
- ☐ ELECTRICIANS EXAMINATIONS, 250 Pages . 1
- ☐ ELECTRIC POWER CALCULATIONS, 425 Pages. 2
- ☐ HANDY BOOK OF ELECTRICITY, 1440 Pages. 4
- ☐ ELECTRIC DICTIONARY, 9000 Terms . . . 2
- ☐ ELECTRIC LIBRARY, 7000 Pages (12 Book Set) 12
- ☐ MARINE ENGINEERS HANDY BOOK, 1258 Pgs. 4
- ☐ SHIPFITTERS HANDY BOOK, 250 Pages . . 1
- ☐ REFRIGERATION & Air Conditioning, 1280 Pgs. 4
- ☐ MILLWRIGHTS & MECHANICS GUIDE, 1200 Pgs. 4
- ☐ POWER PLANT ENGINEERS GUIDE, 1500 Pages 4
- ☐ ENGINEERS & FIREMANS EXAMS, 525 Pages . 1
- ☐ PUMPS, Hydraulics & Air Compressors, 1658 Pgs. 4
- ☐ ENGINEERS LIBRARY (3 Book Set) . . . 3
- ☐ MECHANICAL DICTIONARY, 950 Pages . . . 4
- ☐ GARDENERS & GROWERS GUIDES (4 Book Set) 6
- ☐ CARPENTERS & BUILDERS GUIDES (4 Book Set) 6
- ☐ PLUMBERS & Steamfitters Guides (4 Book Set) 6
- ☐ MASONS AND BUILDERS GUIDES (4 Book Set) 6
- ☐ PAINTERS & DECORATORS MANUAL, 450 Pgs. 2
- ☐ HOUSE HEATING GUIDE, 1000 Pages . . . 4
- ☐ OIL BURNER GUIDE, 384 Pages 1

Name _____

Address _____

Occupation _____

Employed by _____ 20A

The Magic *of Mind*

WERE the great personages of the past victims of a stupendous hoax? Could such eminent men of the ancient world as Socrates, Pericles and Alexander the Great have been deluded and cast under the spell of witchcraft—or did the oracles whom they consulted actually possess *a mysterious faculty of foresight?* That *the human mind can truly exert an influence over things and conditions* was not a credulous belief of the ancients, but a known and demonstrable fact to them. That there exists a wealth of infinite knowledge just beyond the border of our daily thoughts, which can be aroused and commanded at will, was not a fantasy of these sages of antiquity, but a dependable aid to which they turned in time of need.

It is time you realized that the rites, rituals and practices of the ancients were not superstitions, but supterfuges to conceal the marvelous workings of natural law from those who would have misused them. Telepathy, projection of thought, the materializing of ideas into helpful realities, are no longer thought by intelligent persons to be impossible practices, but instead, *demonstrable sciences,* by which a greater life of happiness may be had.

One of America's foremost psychologists and university instructors, says of his experiments with thought transference and the powers of mind—"The successes were much too numerous to be merely lucky hits and one can see no way for guessing to have accounted for the results." *Have you* that open-minded attitude of today which warrants a clear, positive revelation of the facts of mind which intolerance and bigotry have suppressed for years? *Advance with the times;* learn the truth about your inherited powers.

Let this free book explain

The Rosicrucians (NOT a religious organization) have been leaders in introducing the ancient wisdom of mental phenomena. Established throughout the world for centuries, they have for ages expounded these truths to those thinking men and women who sought to make the utmost of their natural faculties. Use the coupon below—avail yourself of a pleasing book of interesting information which explains how you may acquire this most *unusual* and *helpful knowledge.*

The ROSICRUCIANS
(AMORC)

USE THIS COUPON

Scribe: X. L. C.
The Rosicrucians, AMORC
San Jose, California

I am sincerely interested in knowing more about this unseen, vital power which can be used in acquiring the fullness and happiness of life. Please send me, without cost, the book, "THE MASTERY OF LIFE," which tells me how to receive this information.

Name _____

Address _____ State _____

LEARN

TELEVISION-RADIO OR ELECTRICITY

ON REAL EQUIPMENT

IN THE GREAT SHOPS OF COYNE

NEW OPPORTUNITY FIELD

The tremendous growth of the new field of TELEVISION is almost unbelievable. New stations are springing up rapidly bringing television to millions of people in all parts of the country. Fast becoming one of the top industries. Unusual opportunity to get in on ground floor of this great opportunity field. Coyne offers practical-technical training in **Television-Radio**. Installation, testing, trouble shooting and service on Television, F-M and Radio equipment. Get big free book today.

Get into the OPPORTUNITY FIELD OF ELECTRICITY

For many years Electricity has been a most vital factor in industry. This great field will continue to grow and become more important. Thousands of trained Electrical men will be needed. Why be satisfied with a "no future" job? Prepare for a good job with a real future in Electricity.

Coyne Trained Men in Good Jobs

Thousands of **Coyne** trained men in good jobs or in a business of their own in Television-Radio and Electricity, make real money while others putter along. Yes, you can get ready for Good Pay—a Big Future—by training at COYNE here in Chicago. Here you work on real equipment—do actual wiring and trouble-shooting — get the practical-technical training you need.

Not "Home-Study"

We do not teach by mail. All training is given in our Great Training Shops in Chicago, plus necessary theory. Expert instructors guide you. No advanced education or previous experience needed.

START NOW—PAY LATER

Enroll now, pay most of tuition later. If you need part-time work to help out with living expenses while at **Coyne**, we'll help you get it. **G.I. approved.**

1 You are TOLD the how and why of each job.

2 You're shown how to do typical jobs by trained instructors.

3 You DO practical job YOURSELF on equipment.

Mail Coupon for Big FREE BOOK

Whether you prefer Television-Radio, or Electricity, train on actual equipment, at Coyne. We have a Big, fully illustrated book we'll send you if you will indicate below which course you are interested in. Fill in and mail coupon TODAY. Paste it on a penny postcard if you wish. Complete details will come by return mail. No salesman will call.

B. W. Cooke, President
COYNE ELECTRICAL & TELEVISION-RADIO SCHOOL
An Institution not for Profit
500 S. Paulina St., Chicago, 12
Dept. 11-73H

B. W. COOKE, President
COYNE ELECTRICAL & TELEVISION-RADIO SCHOOL
500 S. Paulina St., Chicago 12
Dept. 11-73H

Send your BIG FREE BOOK and details of your training offer. This does not obligate me and **no salesman will call.** I am interested in

☐ TELEVISION-RADIO ☐ ELECTRICITY

NAME .....

ADDRESS .....

CITY ..... STATE .....

"Cash In" On YOUR HIDDEN CREATIVE POWER

THOUSANDS of people have hidden creative power—but few know how to bring it out, and how to develop their ideas into *practical* form. Now you can *"cash in"* on your hidden creative powers, thanks to the more than 100 *tested* formulas revealed in a fascinating new book.

The author, Alex Osborn (of the advertising agency, Batten, Barton, Durstine & Osborn) discovered years ago that 90% of our time in school is spent learning facts. Only 10% is spent developing *imagination*. So for years he studied the idea-developing methods used by famous inventors, scientists, business men, and other successful people. Now he has put all his findings in a new book, "Your Creative Power." It is a simple, practical guide to getting and developing ideas.

How to Think Up Ideas

Here are just a few of the things this book tells you:

- **How some famous ideas were born**
- **How to think up ideas**
- **How to recognize good ideas**
- **How to develop big ideas step by step from little ideas**
- **How to present your ideas to others**
- **How to collaborate on ideas with others**
- **The 10 habits that kill ideas**
- **The 10 habits that breed ideas**
- **How a single idea made $5,000,000**

What Well-Known People Say

Dale Carnegie—"I wish I had had the privilege of reading your book when I started my career. It should be used as a textbook in every college in the land."

Dr. Waldo Semon, Inventor of Koroseal, has recommended the book to fellow scientists.

Arthur Nielsen, President of world's largest research organization—"It is not only fascinating but absolutely sound. It's a veritable gold-mine of practical ideas."

Dr. C. W. Fuller, Inventor of Angle Tooth Brush—"This book is simply a knockout. It is so stimulating to the imagination that it should be adopted as a textbook and read by everybody."

G. Lynn Sumner, President, G. Lynn Sumner Co.—"The best, most helpful and most stimulating book on creative thinking I have ever read."

The president of a $44,000,000 company was so excited about the book that he had parts of it reproduced and distributed to his associates. He reported that it worked miracles.

Read It 10 Days FREE

The coupon (without money) will bring you a copy for 10 days' free reading. Unless convinced that its 355 pages will help you get more ideas and develop them into a practical form, return the book and owe nothing. Charles Scribner's Sons, Dept. 731, 597 Fifth Ave., New York 17, N. Y.

Charles Scribner's Sons, Dept. 731
597 Fifth Ave., New York 17, N. Y.

Please send me YOUR CREATIVE POWER for 10 days' FREE examination. Within that time I will remit $3.00 plus a few cents mailing charges, or return the book.

Name_____

Address_____

_____

SAVE! If you enclose payment, publisher will pay mailing charges. Same return privilege; refund guaranteed.

Letters

Flying Imagination

Sir:

You say scientists consider Frank Scully's book *Behind the Flying Saucers* preposterous [Nov., p. 286]. Flying saucers today are not any more preposterous than a claim of an atomic bomb would have been in 1944. Why doesn't our country try to discover the

secrets of magnetic travel and defense instead of wasting money on an H-bomb? As you probably know, there are 1,257 magnetic lines of force to the square centimeter, and if two lines are crossed we get detonation and fire. . . .

FREDERICK A. ALLEN

Rock Tavern, N. Y.

We know nothing of the sort.

In Defense of Racing

Sir:

To people who contend that auto racing is too dangerous, I'd like to suggest that they look closely at some of the ideas for making cars safer in your cover story last July. Most organized racing associations already require two of them: roll-over bars or frames, and seat belts.

DAVE ROBERTSON

Seattle, Wash.

More About Asphalt Tile

Sir:

Your readers might like to know something more I learned about asphalt tile since doing the flooring job I described in your November issue, page 177.

Last week we had a small oil leak in our furnace, which I didn't get around to fixing over the week end. When I did get to

INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

CLARENCE A. O'BRIEN & HARVEY JACOBSON

Registered Patent Attorneys

12-A DISTRICT NATIONAL BUILDING

WASHINGTON 5, D. C.

LET US PUT THIS
Magnificent NEW 1951
MIDWEST
TELEVISION-
RADIO-PHONO
Console In Your Home
for 30 DAYS MONEY BACK TRIAL

MAMMOTH 19½-Inch PICTURE TUBE
AM-FM Radio and 3-Speed Phonograph

Be your own judge! See and hear Midwest Television in your own home. Then decide whether to keep it or have your money refunded. Low Factory Prices.

Also Available on 30 DAYS TRIAL!
The Sensational New 5-Band World-ranging 1951 Model
MIDWEST RADIOS

Send This COUPON on 1c Post Card for NEW 1951 FREE 4 Color MIDWEST CATALOG

MIDWEST RADIO & TELEVISION CORP.
Dept. 24-G, 909 Broadway, Cincinnati 2, Ohio
NAME
ADDRESS
CITY ZONE STATE

it, I found nine tile squares had been eaten through by action of the small pool of oil that had collected. The Armstrong people tell me that regular asphalt tile is badly affected by oils and greases, but that a special greaseproof asphalt tile is available for use where it might be needed.

Anyhow, your readers should know that any kind of oil spilled on ordinary asphalt-tile flooring should be wiped up immediately and thoroughly.

HENRY MORTON

Flushing, N. Y.

Hard Way to Steal a Car

Sir:

In "Hints from the Model Garage" in September, page 195, you showed a supposed way to foil car thieves by clipping a padlock through a hole drilled in the clutch-pedal arm, down close to the floorboard, so that the pedal couldn't be pushed down. It wouldn't necessarily work, and I'll bet I could drive to New York without using the clutch, to prove my point.

Here's how:

Warm up the engine with the shift in neutral. Kill engine. Start engine with shift in low—jerky, but can be done. Accelerate

to about 10 m.p.h. in low. Back off accelerator till engine floats, then shift to neutral. Slow engine further till gears match for second speed. Etc.

Right?

DON ADAMS

Cowiche, Wis.

It is indeed possible—but what thief would risk a getaway like that?

Nothing New

Sir:

In your October issue, page 174, appears an article on a table that has built-in chairs. It states that this was invented by some fellow in England. I happen to know that at

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

McMORROW, BERMAN & DAVIDSON

Registered Patent Attorneys

PATENTS • COPYRIGHTS • PATENTS

142-L VICTOR BUILDING, WASHINGTON 1, D. C.

Which of these 2 one time WEAKLINGS PAID only a few Cents to become an "All-Around" HE-MAN at Home?

Which One Paid Hundreds Of Dollars To Train At My Side? Rex Ferris, was a skinny weakling, paid a few cents to start building into a Champion All Around He Man! Larry Campbell paid me hundreds of dollars to train at my side years ago. Start to become an All-Around He Man at home with these same secrets for only a few cents—like Rex Ferris did!

Amazing get-acquainted offer—YOURS for only 10c INSTEAD OF $1 FOR ALL 5 COURSES Plus FREE Photo Book!

Be a Winner at Anything YOU Tackle with Progressive Power

SPORTS! JOB! SCHOOL! FRIENDS!

"The Jowett System is the greatest in the world!" says R. F. Kelly, Physical Director, Atlantic City

Let's Go, Pal! I'll prove I can make YOU an "ALL-AROUND" HE-MAN

FAST—OR NO COST! says George F. Jowett World's Greatest Body Builder

Enjoy My "Progressive Power" Strength Secrets! Give Me 10 Easy Minutes a Day —Without Strain!

I'll teach you the "Progressive Power Method" through which I rebuilt myself from a physical wreck the doctors condemned to die at 15, to the holder of more strength records than any other living athlete or teacher! "Progressive Power" has proven its ability to build the strongest, handsomest men in the world. And I stand ready to show you on a money back basis—that no matter how flabby or puny you are, I can do the same for you right in your own home. Let me prove I can add inches to your arms, broaden your shoulders, give you a man-sized chest, powerful legs and a rock-like back—in fact, power pack your whole body so quickly it will amaze you! Yes, I'll jam you with power and confidence to master any situation—to win popularity—and to get ahead on the job! Through my proven secrets I bring to life new power in you inside and out, until YOU are fully satisfied you are the man you want to be.

PROVE IT TO YOURSELF IN ONE NIGHT

Send only 10c for my 5 easy-to-follow, picture-packed courses now in 1 complete volume "How to Become a Muscular He-Man." Try it for one night! Experience the thrilling strength that surges through your muscles.

10 DAY TRIAL! Think of it—all 5 famous courses in one picture-packed muscle-building volume only 10c. You must actually FEEL results in ONE WEEK, or your money will be promptly refunded!

George F. Jowett Whom experts call "Champion of Champions"

● World's wrestling and weight lifting champ at 17 and 19. ● World's Strongest Arms. ● 4 times World's Perfect Body—plus other records.

FREE! Photo Book of Famous Strong Men!

I want thousands of new friends—regardless of cost! Get all 5 (Valued at $5 Bench) Muscle Building Courses, for only 10c. Packed with How-To-Do-It Pictures! Start to build a body you will be proud of.

FREE GIFT COUPON!

George F. Jowett Champion of Champions

Jowett Institute of Physical Training Dept. 230 Fifth Avenue, New York 1, N. Y. PS-11

Dear George:—Please send by return mail, prepaid, FREE Jowett's Photo Book of Strong Men, plus all 5 Muscle Building Courses, 1. Molding a Mighty Chest. 2. Molding a Mighty Arm. 3. Molding a Mighty Grip. 4. Molding a Mighty Back. 5. Molding Mighty Legs—Now all in One Volume "How to Become a Muscular He-Man." Enclosed find 10c for postage and handling. No C.O.D.'s.

Name.....Age.....

Address.....

City.....Zone & State.....

City College of New York the tables in the cafeteria in Army Hall are built this way. They've been there for quite some time. The old saying still holds. . . .

ROBERT BARTO

The Bronx, N. Y.

Pictures Don't Lie

Sir:

The Oldsmobile sedan that you described as "brand new" in your article about roll-over tests at the GM Proving Ground [Oct., p. 173] looks like a '49 model to me.

STEPHEN GILVAR

Englewood, N. J.

Sir:

Your picture of the Olds rolling over shows its front bumper being knocked off as it hits the ground. Yet the "after" photo shows the bumper back in place. How come?

DONALD FRANCO

Saratoga Springs, N. Y.

We slipped in calling the car new: it was a '49. But that's not its bumper falling off —just part of the towing gear.

How to Stop

Sir:

As a regular reader of PS, I'd like to put to your experts a simple question on which I encounter a lot of argument. It's this. When coming to a stop in an automobile from fairly high speed, should you put on the brakes before releasing the clutch or should the clutch be disengaged and then the brakes applied?

LOUIS NEFF, JR.

Baton Rouge, La.

Among good drivers there's no argument on that one: Apply the brakes first. Do not disengage the clutch until you have almost stopped. This allows the engine to help brake the car.

Ingenuity Saves Time

Sir:

Here's a trick that other PS readers may find as useful as I have:

Occasionally you print plans for jigsaw work drawn in half size. To avoid the tedious job of redrawing them in full size, I put the plans in my enlarger just as I would

NOW . . . GET EVERYTHING YOU NEED TO LEARN AND MASTER

TELEVISION

RADIO-ELECTRONICS ...AT HOME!

Use REAL commercial-type equipment to get practical experience

Here's the REAL THING!

Your future deserves and needs every advantage you can give it! That's why you owe it to yourself to find out about one of the most COMPLETE, practical and effective ways now available to prepare AT HOME for America's billion dollar opportunity field of TELEVISION-RADIO-ELECTRONICS. See how you may get and keep the same type of basic training equipment used in one of the nation's finest training laboratories . . . how you may get real STARTING HELP toward a good job or your own business in Television-Radio-Electronics. Mail the coupon today for complete facts — including 89 ways to earn money in this thrilling, newer field.

ABOVE: Build and keep a real 16 INCH commercial TV receiver. Optional after completing regular training at slight additional cost.

SET UP YOUR OWN HOME LABORATORY

D.T.I., ALONE, INCLUDES BOTH MOVIES and HOME LABORATORY

In addition to easy-to-read lessons, you get the use of HOME MOVIES — an outstanding training advantage — plus 16 big shipments of Electronic parts. Perform over 300 fascinating experiments for practical experience. Build and keep real commercial-type test equipment shown at left.

MODERN LABORATORIES

If you prefer, get all your preparation in our new Chicago Training Laboratories—one of the finest of its kind. Ample instructors, modern equipment. Write for details!

MILITARY SERVICE!

If you're subject to military service, the information we have for you should prove doubly interesting. Mail coupon today.

Get BOTH of these Information packed publications FREE!

HOME MOVIES

ACT NOW! MAIL COUPON TODAY!

DeFOREST'S TRAINING, INC., Dept. PS-1-H
2533 N. Ashland Ave., Chicago 14, Ill.

Without obligation, I would like your late News-Bulletin showing 89 ways to earn money in Television-Radio-Electronics . . and how I may prepare to get started in this thrilling field.

Name ..... Age .....
Street ..... Apt. .....
City ..... Zone ..... State .....

De FOREST'S TRAINING, INC.
CHICAGO 14, ILLINOIS
A DeVRY INSTITUTION

INVENTORS

If you consider your invention to be something of importance — if you have invented any new and useful art, machine, manufacture or composition of matter or improvement thereof — you are advised to protect your invention by applying for a U. S. patent.

This firm is registered to practice before the U. S. Patent Office and is available to assist in the preparation and prosecution of your patent application.

The "Evidence of Invention" form mentioned below is offered as a convenience to you in making your disclosure to us for search purposes.

You should date and sign your disclosure and have it witnessed by two or more persons who are capable of understanding your invention.

Your disclosure should be mailed to us together with a letter authorizing us to conduct a preliminary search among previously granted U. S. patents for similar types of invention.

We then make this search and prepare a report of the probable patentability of your invention. If such report is favorable, we recommend the further course for you to take.

The "Evidence of Invention" form and booklet are suggested as conveniences to you and us in starting action on your invention.

VICTOR J. EVANS & Co. Merlin M. Evans
REGISTERED PATENT ATTORNEY
640-A MERLIN BUILDING, WASHINGTON 6, D. C.
PATENTS COPYRIGHTS

We shall be glad to send you promptly and without obligation, an instructive booklet, "Patent Protection for Inventors", which was prepared to give inventors detailed information and steps to take toward patent protection—also our convenient "Evidence of Invention" form. Use address Victor J. Evans & Co., 640-A Merlin Building, Washington 6, D. C.

with a photo. Then I adjust the enlarger for double size and make a print.

ALAN ADLER

Los Angeles

That should work if: (1) the plans[1] are small enough to fit into the enlarger; (2) there's no heavy printing on the back.

Hybrid Engine

Sir:

It comes as a surprise to me that no one seems to have thought of coupling a turbojet with a steam turbine to make a more efficient engine. This would utilize the expanding burning gases to drive the compressor stage and the heat of the exhaust—now wasted—to generate steam for the power stage, which would be a steam turbine.

FRANK S. PYNE

Christchurch, New Zealand

Marble Trick

Sir:

Burning the oxygen out of a partly empty bottle of photo developer to prevent oxidation, as suggested in your October issue [p. 233], seems like the long way around a simple problem. Hasn't your contributor ever heard of just dropping glass marbles into containers of darkroom solutions to keep the fluid level up to the top and exclude air?

H. ABSHER

Ottawa, Ill.

Water Softeners

Sir:

Two questions on your October story about water softeners:

1: Isn't there a mixup in the caption under the sketch of the homemade softener on page 223? Seems to me that valves 1 and 3 should be opened for softening; valves 2 and 4, for regeneration.

2. Will softening the water affect it for drinking?

DONALD MCNAIR

Delia, Alberta, Canada

1. You're right—we were wrong.

2. Softening the water doesn't make much difference in taste; it changes the composition of only the hard-water chemicals—a few parts in a million parts of water.

Learn RADIO

TELEVISION, ELECTRONICS & MASTER SHOP METHOD HOME TRAINING

Let NATIONAL SCHOOLS, of Los Angeles, a practical Technical Resident Trade School for almost 50 years, train you for today's unlimited opportunities.

FREE Books

Check the one you want

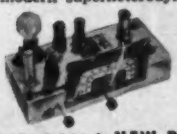
WE BRING NATIONAL SCHOOLS TO YOU!

GOOD JOBS AWAIT THE TRAINED RADIO TECHNICIAN

You are needed in the great modern Radio, Television and Electronics industry! Trained technicians are in constant and growing demand at excellent pay—in Broadcasting, Communications, Television, Radar, Research Laboratories, Home Radio Service, etc. National Schools Master Shop Method Home Study Course, with newly added lessons and equipment, can train you in your spare time, *right in your own home*, for these exciting opportunities. Our method has been proved by the remarkable success of National Schools-trained men all over the world.

You Learn by Building Equipment with Standard Radio Parts We Send You

Your National Schools Course includes not only basic theory, but *practical* training as well—*you learn by doing*. We send you complete standard equipment of professional quality for building various experimental and test units. You advance step by step until you are able to build the modern superheterodyne receiver shown above, which is yours to keep and enjoy. You perform more than 100 experiments—build many types of circuits, signal generator, low power radio transmitter, audio oscillator, and other units. The Free Books shown above tell you more about it—send for them today!



NOW! NEW PROFESSIONAL MULTITESTER INCLUDED

This versatile testing instrument is portable and complete with test leads. Simple to operate, accurate and dependable. You will be able to quickly locate trouble and adjust the most delicate circuits. You can use the Multitester at home or on service calls. It is designed to measure AC and DC volts, current resistance and decibels. You will be proud to own and use this valuable professional instrument.

Lessons and Instruction Material Are Up-to-date, Practical, Interesting

National Schools Master Shop Method Home Training gives you basic and advanced instruction in all phases of Radio, Television and Electronics. Each lesson is made easy to understand by numerous illustrations and diagrams. All instruction material has been developed and tested in our own shops and laboratories, under the supervision of our own engineers and instructors. A free sample lesson is yours upon request—use the coupon below.

TELEVISION TRAINING A complete series of up-to-the-minute Television lessons is an integral part of your course, covering all phases of Television repairing, servicing and construction.

Here are just a few of the interesting facts you learn with the **FREE SAMPLE LESSON**

1. How radio receivers operate.
2. How the antenna circuit is constructed.
3. Converting signal currents into sound.
4. How the R-F transformer handles the signal.
5. How the tuning circuit functions.
6. The Radio "bands."

APPROVED FOR VETERANS
Check coupon below.

NATIONAL SCHOOLS

LOS ANGELES 37, CALIFORNIA EST. 1905

MAIL OPPORTUNITY COUPON FOR QUICK ACTION

National Schools, Dept. 1-PS (Mail in envelope or
4000 South Figueroa Street paste on penny postcard.)
Los Angeles 37, California

Mail me FREE the book "Your Future in Radio-Television" and the sample lesson of your course. I understand no salesman will call on me.

NAME _____ AGE _____

ADDRESS _____

CITY _____ ZONE ____ STATE _____

☐ Check here if veteran of World War II

I'LL TRAIN YOU
for RADIO
MEET A Few of My GRADUATES
Appreciates Sprayberry Personal Interest
"Before completing your course I had a good paying job. I appreciate the personal interest you gave me."—Leonard Petrus, Arkansas
Best Investment He Ever Made
"Began fixing radio sets after first few lessons. Your course is one of the best investments I've ever made."—A. R. Foronda, Hawaii
I Send You 18 BIG KITS OF RADIO-TELEVISION EQUIPMENT
EXTRA MONEY
Earn While You Learn In Your Spare Hours!
You do all your training with me AT HOME in spare hours. Keep right on with your present job and income while learning—and earn extra cash besides! The day you enroll I begin sending you plans and ideas for doing profitable spare time Radio-TV work. Many of my Sprayberry students pay for their entire Radio-TV training this way!
YOU KEEP THIS VALUABLE EQUIPMENT
The many big kits of Radio-Television parts and equipment are sent to my students "for keeps." Nothing need be returned—it is YOURS! There is absolutely nothing else to buy!

AT HOME IN SPARE TIME

TELEVISION

Training Leads To Good Radio Job
"Got a job in local radio shop soon after enrolling. Very satisfied with training"—Stanley Clemmons, Kansas

Lucky To Be Sprayberry Trained
"I consider myself lucky I chose your training in preference to others I considered. Here's thanking you again."—Paul White, Ohio

Radio Profits Pay Cost of Training
"I have more than taken in the cost of your training doing spare time radio repair work. See bright future ahead"—Thomas Shearer, N. Y.

Earns Easy Spare Time Cash
"While training I made about $180.00 in spare time. Thank you for wonderful Radio-TV training"—Herbert Burroughs, W. Va.

My Proved Training System—Backed by a Quarter Century of Experience—Prepares You FAST for a Good Job or Your Own Profitable Radio-Television Business!

Radio-Television is now America's greatest opportunity field. Correctly trained men are needed NOW—more than ever—to fill good jobs and handle the profitable Radio-Television Service work. I have trained hundreds of successful men for Radio-Television—and I stand ready to train YOU too—even if you have no experience or knowledge of this field. My training is modern—right up to the second—with all the newest developments included! This is 100% practical training that eliminates the frills that only waste your time and progress. Sprayberry Training provides the all-important practical knowledge and skill you need to start making money in Radio-Television in the shortest possible time. You can start at once and be earning welcome spare time cash in a few short weeks. Upon completion of my Training you will be ready to handle any practical Radio-Television job.

You receive all the equipment I have illustrated on the opposite page—and MUCH MORE besides! In addition to your fascinating Sprayberry home study lessons, I send you a total of 18 kits of quality parts and equipment with which you do over 300 practical demonstrations, experiments and construction projects. You build a complete television set that you can use in your shop or at home—you build a powerful TWO-BAND superheterodyne radio set—a multi-range test meter—signal generator and other valuable test equipment—a cathode ray oscilloscope—everything needed to set up your own Radio-Television Service Shop! All equipment I send you is yours to keep. In addition I send you many valuable service manuals, books and reference material to help you in your day-to-day Radio-Television work. I firmly believe I offer the ambitious man the most outstanding training value of its kind in America today!

Be Ready for Top Paying Radio-Television Jobs!

Radio-Television is growing with amazing speed. More than 2000 broadcasting stations PLUS an additional 102 Television stations are now on the air. Radio sets and TV receivers are being made and sold in record breaking numbers. If you enjoy working with your hands . . . if you like interesting and varied work . . . YOU BELONG IN RADIO-TELEVISION. But you MUST have good Training to "cash in" . . . the training that starts with basic fundamentals and carries through every circuit and problem of Radio-TV.

No Previous Experience Needed to Succeed

My Training in Radio-Television is so complete, so down-to-earth that previous experience is not necessary. I start you with basic fundamentals and carry you in easy, practical steps through one Radio-Television subject after another. You will be amazed at your rapid progress and your knowledge of Radio-Television. Best of all, you put this knowledge to work making spare time cash soon after you enroll! You may train as fast or as slowly as suits your convenience. Each of my students receives individual training!

VETERANS

My Radio Training is approved for Veterans under the G.I. Bill.

If you are Experienced...

in radio . . . I'll qualify you for Television in 4 to 8 weeks. Check coupon for special details.

Sprayberry Academy of Radio, Dept. 55-S
111 North Canal St., Chicago 6, Ill.

FREE 3 Big Radio and Television Books

I want you to have ALL the facts about my complete system of Radio-Television Training! Act now! Rush the coupon for my three big Radio-Television books: "How To Make Money in Radio-Television," PLUS my new illustrated Television bulletin PLUS an actual sample Sprayberry Lesson—all FREE with my compliments. No obligation and no salesman will call on you. Send the coupon in an envelope or paste on back of post card. I will rush all three books at once!

Mail Coupon Today!

NO OBLIGATION
No Salesman Will Call

SPRAYBERRY ACADEMY OF RADIO, Dept. 55-S
111 North Canal St., Chicago 6, Ill.

Please rush to me all information on your Radio-Television Training plan. I understand this does not obligate me and that no salesman will call upon me.

Name..... *Age*.....

Address.....

City..... *State*.....

Please Check Below About Your Experience

☐ Are You Experienced? ☐ No Experience

$250,000 FOR THIS!

3100 Other Inventions Badly Needed—Big Cash Waiting for Your Little Ideas

IT'S OFTEN the *simplest* ideas that make the *most* money! The Kiddie Kar brought its inventor a cool MILLION dollars. A 70-year-old grandmother made $350,000 on an improved overall buckle. The paper clip and the hairpin made fortunes for the people who "dreamed" them up.

You can cash in, too—*if you concentrate on the inventions that are really needed!*

THE EASY WAY TO GET STARTED

Don't waste time and brain-work on something nobody wants! Find out WHAT to invent. This brand-new, revised, and enlarged book by Raymond F. Yates, noted science editor and inventor, lists and describes over 3100 PRACTICAL, money-making ideas that are crying aloud to be invented!

These 3100 ideas are the things *most needed and most likely to make money*. In this comprehensive 352-page book, they are listed under 39 headings for quick reference: Electrical, Television and Radio, Automotive, Agricultural, Building, Household, Toys, Timesavers, etc. Book ALSO lists inventions needed for National Defense and tells how to submit them to U. S. Inventors Council; tells how to think inventively, how to develop an invention STEP-BY-STEP, etc.

SEND NO MONEY
FREE 5-DAY EXAMINATION

Wouldn't you like a slice of the $280,000,000 that American inventors get each year in royalties? Get started now! You don't risk a penny. Simply mail coupon below WITHOUT MONEY—and get Yates' "3100 Needed Inventions" for 5 days FREE TRIAL. If you are not convinced this book can help you make money—just return it and owe nothing. Otherwise, send only $2.95, plus few cents postage, as payment in full.

Any one of the 3100 ideas in this book can bring somebody a fortune. Maybe it can be YOU! Mail coupon at once! Wilfred Funk, Inc., Dept. T591, 381 Fourth Ave., New York 16, N.Y.

Same FREE 5-Day Offer on "YATES' GUIDE TO SUCCESSFUL INVENTING"

This OTHER book by Ray Yates tells how to protect, patent, and sell your inventions. Tells WHERE to go, WHOM to see, and HOW to sell your ideas for the quickest and biggest royalties! (Check proper box in coupon to examine it FREE!)

WILFRED FUNK, Inc., Dept. T591,
381 Fourth Ave., New York 16, N. Y.

Please send me Yates' 3100 NEEDED INVENTIONS for FREE EXAMINATION. If I keep the book I will send you $2.95 plus few cents postage. Otherwise I will return it within 5 days without further obligation.

☐ Send me Ray Yates' GUIDE TO SUCCESSFUL INVENTING, for 5 days' FREE EXAMINATION. If I decide to keep it I will send you $2.95 plus a few cents postage. Otherwise I will return it, owe nothing.

Name.....

Address.....

City.....(If any).....Zone No.....State.....

☐ Check here if enclosing payment in full WITH this coupon, as per prices above. Then WE pay all postage charges. If you do not want to keep the book (or books) we will promptly refund your money if you mail the shipment back after 5-day examination. *(Canadian Orders: Send 25 cents extra for carrying charges. Only U. S. currency accepted.)*

MAKE YOUR OWN! WITH

Griffin READYCUT LEATHER PROJECTS

Over 100 KITS in every kind of Tooling and Carving Leather, accurately cut, all parts included. Only Top Grade Leathers used. You do the choosing. You do the tooling, carving, stamping, the punching and assembling.

SEND 25¢ FOR COMPLETE CATALOG 116 pages, shows all hand craft supplies. 25¢ refund with first order.

OUT OF THE WEST, THE HOME OF LEATHER CARVING

Griffin CRAFT SUPPLIES

Since 1924 • 3426-B TELEGRAPH AVE. OAKLAND 9, CALIFORNIA

EVERYTHING FOR THE LEATHER WORKER

Largest, most complete stock of Leathercraft Tools and Accessories in U.S.A.

HIDES AND SKINS of Craft Leathers of every kind if you prefer to cut your own.

STUDY AT HOME

WITH AN EDUCATIONAL INSTITUTION

Courses in ENGINEERING: Electrical, Civil, Mechanical, Drafting, Architectural, Automotive, Steam, Diesel, Aeronautical, Radio, Structural, Mining, Industrial, Petroleum, Marine, Refrigeration, Air Conditioning, Chemical.
Courses in ARTS AND SCIENCES: Philosophy; Education; Letters; Public Health; Medical Jurisprudence; Psychology; Sociology; Physics; Chemistry; Geology; Pol. Science; Theology; Law; Business and Commerce; Accounting; Mathematics; Statistics; Agriculture. **Send for free catalog.**

McKinley-Roosevelt Incorporated, 4610-A3, Sheridan Rd., Chicago 40, Illinois

LEARN TO HYPNOTIZE

Yes, anyone. Modern speed hypnotism. Methods revealed. You are shown exactly what to say and do. Many interesting experiments. Self-hypnosis is fully explained. Amazing results. Detailed hypnotic tests given. Learn this exciting fascinating art. Hold your friends absolutely spellbound. Entertain.

Send for the startling book "HYPNOTISM REVEALED" ⟶ **$1**

12" Phonograph Record Inducing Self-Hypnosis plus Individual & Group-Hypnotism **$5**

MELVIN POWERS, Professional Hypnotist, 1324 Wilshire, Dept. 75, Hollywood 17, Calif.

BE A LANDSCAPE CONTRACTOR

or a Landscape Architect. Make $15 to $50 a day. Compare the competition in this field to others & you'll see why we have hundreds of employed graduates from coast to coast. Course includes practical instruction here in addition to approved home study work. Write for free information

NATIONAL LANDSCAPE INSTITUTE
310 So. Robertson Dept. PS-1 Los Angeles 48, Calif.

"YOU ARE UNDER ARREST!"

There's a Thrill in Bringing a Crook to Justice Through Scientific

CRIME DETECTION!

We have taught thousands this exciting, profitable, pleasant profession. Let us teach you, too, in your own home. Learn Finger Printing, Fire Arms Identification, Police Photography and Criminal Investigation thoroughly, quickly and at small cost.

Over 800 of All American Bureaus of Identification employ students or graduates of I. A. S. You, too, can fit yourself to fill a responsible crime detection job with good pay and steady employment. But don't delay—get the details now. Let us show you how easily and completely we can prepare you for this fascinating work, during spare time, in your own home. You may pay as you learn. Write today . . . Now . . . Be sure to state age.

Be A FINGER PRINT Expert

FREE!!! Send for Thrilling "BLUE BOOK OF CRIME"

INSTITUTE OF APPLIED SCIENCE
1920 Sunnyside Ave., Dept. 1361, Chicago 40, Ill.

Air Conditioning
Architecture
Architectural Drafting
Building Foreman
Chemistry
Civil Engineering
Concrete Engineering
Electrical Engineering
Heating
Highway Engineering
Mining
Plastics
Plumbing
Paper Making
Refrigeration
Steam Engineering
Structural Engineering
Structural Drafting

Auto Technician
Aviation
Airplane Drafting
Diesels
Drafting
Flight Engineer
Foundry Work
Gas Engines
Heat Treatment of Metals
Mechanical Engineering
Metal Pattern Drafting
Reading Shop Blueprints
Radio
Railroad Courses
Sheet Metal
Surveying
Tool Designing
Textiles

Accounting
Advertising
Arithmetic
Bookkeeping
Business Corresp.
Business Management
C. P. A.
Cost Accounting
Commercial Art
Foremanship
French • Spanish
High School
Illustrating
Postal Civil Service
Secretarial
Salesmanship
Stenography
Traffic Management

I.C.S.

GET YOUR FREE BOOK

Send today for your free copy of booklet describing the subject in which you are interested. World-famous I.C.S. Courses can be your steppingstones to success, can help you prepare yourself for promotion and better pay.

YOUR CHOSEN SUBJECT

APPROVED UNDER THE G. I. BILL

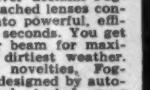
INTERNATIONAL CORRESPONDENCE SCHOOLS
Box 7676-M, SCRANTON 9, PENNA.

Please send me a free copy of the booklet covering the following subject:

Subject _____
Name _____ Age _____
Home Address _____
City _____ State _____
Present Position _____
Employed by _____
Working Hours _____ A. M. to _____ P. M.
Length of Service in World War II _____

EXPERTS ENDORSE FOG-FIGHTERS

Expert drivers the nation over acclaim Fog-Fighters. For these easily attached lenses convert your car's headlights into powerful, efficient fog lamps . . . in just seconds. You get benefit of full power amber beam for maximum visibility in even the dirtiest weather. Definitely not gadgets or novelties, Fog-Fighter lenses are precision designed by automotive engineers—and road tested over toughest conditions by our own experts. You'll use your brights in up or down position without blinding on-coming vehicles. Fog-Fighters eliminate completely the need for expensive, inefficient, accessory foglights. Made of an unbreakable, weatherproof Ethyl derivative, Fog-Fighters fit your glove compartment . . . go on or off as needed. Patented construction gives instant mounting without marring headlamp finish—cannot be jarred loose on even roughest back-country road.



Save your life, save your car. Get these miracle Fog-Fighter lenses today. Send cash, check, or money order to:

BETTER PRODUCTS COMPANY
Dept. PS-1
154 Nassau Street New York 7, New York

Precision Caliper

$14.00 POSTPAID

"MZB" MAUSER-TYPE VERNIER CALIPER

An indispensable measuring tool for precision work in any trade or workshop. Highest accuracy and dependability. Measures inside, outside, thread and depth to 1/1000" and 1/20 millimeter. 8" overall, 6" graduation. Highest quality throughout with glass-hard measuring surfaces. This is your opportunity to buy a first-class precision tool at about half the price of comparable tools. Shipment from stock. Be sure to get yours by ordering it now. Sold with a money back guarantee for only **$14.00** postpaid if you send us your check or M. O. You pay postage on C.O.D.

INTER-CONTINENTAL TRADING CORP.
90 West Street New York 6, N. Y.

Watch Repairing Pays Big Money Learn at home

Free Literature Tells How

Watchmakers in big demand. You train step-by-step under experts. You learn to take a watch apart—repair and put in perfect working order. 10 easy lessons. We furnish all tools, and a 15 jeweled watch. Practice movement with first lesson.

Turn spare time into cash—perhaps a business of your own. A licensed school. Students 18 to 65 have profited by our training. Low cost.

Write Today for All the Facts—No Obligation

WATCH REPAIRING Dept. PS-11, 2870 Elston Ave., Chicago 18, Ill.

CARVE LEATHER

Easy to Learn in Spare Time. Fascinating, Profitable HOBBY.

Have fun and make money too! Carve handsome bags, billfolds, belts, moccasins, key cases, etc. from our huge and varied stock of Leather Projects that come READY TO CARVE AND ASSEMBLE. To select what you need, write for complete, fully-illustrated catalog. Contains over 200 photographs of projects, leathers, tools and accessories. Learn this fascinating hobby—start small and experiment. Write for catalog today, include 25c to cover printing and mailing.

BURTONS LEATHERCRAFT
Dept. PS-1
1755½ Glendale Blvd.
Los Angeles 26, Calif.

WRITE NOW FOR COMPLETE LEATHER-CRAFT CATALOG!

New Way to Improve YOUR ENGLISH

A command of effective English gives you added advantages and better opportunities. Poor English handicaps you more than you will ever realize. You can improve your English through Sherwin Cody's 100% self-correcting invention. If you are ever embarrassed by mistakes in grammar, spelling, punctuation, or pronunciation, this new free book "How You Can Master Good English in 15 Minutes a Day" will prove a revelation to you. Send for it now. It is free. No obligation. No agent will call. Address **SHERWIN CODY COURSE IN ENGLISH, 181 B & O Building, Rochester 14, N. Y.**

TRI-STATE COLLEGE

B. S. DEGREE IN 27 MONTHS
Founded 1884
WORLD-WIDE ENROLLMENT

Civil, Elect., Mech., Chem., Aero, Radio and Telev. Engineering; Bus. Adm., Acct. Visit campus, see well equipped labs. Low cost. Prep. courses. Personalized instruction. Grads. successful. **Enter Jan., March, June, Sept., Catalog. 511 College Ave., Angola, Ind.**

ILLUSTRATED COMIC BOOKLETS

THE KIND MEN LIKE!

(VEST POCKET SIZE)

They are loaded with rare cartoons. Full of Fun and Humor. ***20 DIFFERENT*** booklets sent prepaid for $1 in plain sealed wrapper. No C. O. D.'s.

GRAYKO, Dept. 2080, Box 520, G.P.O., N.Y.C. 1

GARDEN TRACTORS

NEW CATALOG IN COLOR

It's New! The finest broadside on garden tractors ever issued gives you full details on the famous Speedex 2½ H.P. walking Model C, and on the heavy-duty 8 H.P. riding Model 23. Illustrates many labor-saving uses, shows wide range of implements for plowing, discing, cultivating, mowing, snow removal, lawn mowing, etc. Gives you complete descriptions . . . full information.

Supply limited—write today!

SEND A POSTCARD FOR YOUR *FREE* COPY

SPEEDEX GARDEN TRACTOR CO.
Box 216-D12A, RAVENNA, OHIO

P-1150-42

"We have been using your book on Auto Repair for the past year and feel like it is a third man around the shop."—*F. M. Scott, Stanwood, Wash.*

"Fixed motor in 30 minutes another mechanic had worked on half a day."—*C. Asberry, Murfreesboro, Tenn.*

"Instructions so clear, have no trouble learning anything about any car. Now working as mechanic in big plant."—*S. Ordonez, San Francisco, Calif.*

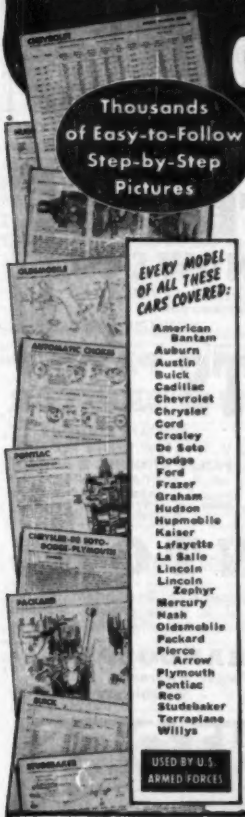
"So easy to understand—have done jobs with Manual I would not have attempted without it."—*C. L. Vanerstrom, Hazel Park, Mich.*

"I have found my MoToR Manual a wonderful help. It has put me in a position to do every job."—*S. L. Sharpless, Los Angeles, Cal.*

THOUSANDS OF MEN ARE RAVING ABOUT THIS GIANT GUIDE!

Now YOU Can Be a "Cracker-jack" at Auto Repairs!

BRAND-NEW 1950 EDITION!



Thousands of Easy-to-Follow Step-by-Step Pictures

EVERY MODEL OF ALL THESE CARS COVERED:

American Bantam
Auburn
Austin
Buick
Cadillac
Chevrolet
Chrysler
Cord
Crosley
De Soto
Dodge
Ford
Frazer
Graham
Hudson
Hupmobile
Kaiser
Lafayette
La Salle
Lincoln
Lincoln Zephyr
Mercury
Nash
Oldsmobile
Packard
Pierce Arrow
Plymouth
Pontiac
Reo
Studebaker
Terraplane
Willys

USED BY U.S. ARMED FORCES

Easy-Step-by-Step Instructions Show How to do ANY Job on ANY Car—from 1935 through 1950!

THOUSANDS of men are raving about MoToR's BIG NEW ILLUSTRATED AUTO REPAIR MANUAL! It enables them to do *any* job FASTER and better; do MORE jobs; make MORE money!

Whether it's on a 16-year-old "jalopy" or a brand-new '50 beauty, YOU, too, can "breeze through" *any* repair job quickly, easily, right! Just look up the make, model, and job in the quick index—and *go to it!*

Everything You Need to Know to Repair Any Car!

This NEW, REVISED, edition has MORE REPAIR INFORMATION THAN EVER—right up to the minute! 740 big pages, 2180 "This-Is-How" pictures — clear drawings, diagrams, cut-away photos that lead you every step of the way. Over 200 "Quick-Check" charts containing more than 35,000 essential repair specifications. Over 200,000 service and repair facts. Clear, simple directions. You *can't* go wrong!

Any man—even a green beginner—can do a good job. If you're a top-notch mechanic, you'll find yourself tackling jobs now that you wouldn't touch before!

Earn More Money! Win Greater Prestige!

The editors of MoToR's Manual have put together all the "Know-How" from over 150 *Official Factory Shop Manuals;* "boiled it down" into one handy book!

Includes Automatic Transmissions and Semi-Automatic Transmissions. Covers the new GM Rochester Carburetor, Engines . . . Chokes . . . Carburetors . . . Fuel Pumps . . . Hydramatic Drives . . . Overdrives . . . Oil Filters . . . Starting Motors . . . Generators . . . Distributors . . . Clutches . . . Universals . . . Axles . . . Brakes . . . Steering Gears . . . Shock Absorbers, etc.

Valuable help in Body Service, Factory Specifications and Adjustment Tables, Tune-up Charts, Tables of Measurements and Clearances, Overhauling and Replacement Facts — AND MUCH, MUCH MORE.

Used by Armed Forces, hundreds of thousands of auto service men! YOU'LL want it, too, once you see its 740 giant pages—almost a foot high!—its 2180 close-up pictures! Try it on the following UNCONDITIONAL GUARANTEE:

Try Book for a Week FREE

Send No Money. Pay nothing to postman. Test book in your own garage or shop. *It's GUARANTEED to pay for itself in 7 days.* If it doesn't, just return the book, and owe nothing. You don't risk a penny. Rush coupon for your free-trial copy of this great money-saving Manual. MoToR Book Dept., Desk 21, 250 West 55th St., New York 19, N. Y.

SEND NO MONEY! TRY BOOK FOR A WEEK FREE!

MAIL COUPON NOW FOR 7-DAY FREE TRIAL

MoToR Book Dept., Desk 21,
250 West 55th Street, New York 19, N. Y.

Rush to me at once: (Check box opposite book you want)

☐ **MoToR's New AUTO REPAIR MANUAL.** If O.K. I will remit $1 in 7 days (plus 35c delivery charge), then $2 monthly for 2 months, and a final payment of 95c a month later. Otherwise I will return book postpaid in 7 days. *(Foreign price, remit $9 cash with order.)*

☐ **MoToR's New TRUCK AND TRACTOR REPAIR MANUAL.** (Described at left.) If O.K. I will remit $2 in 7 days, and $2 monthly for 3 months, plus 35c delivery charge with final payment. Otherwise I will return book promptly. *(Foreign price, remit $10 cash with order.)*

Print Name .....Age .....

Print Address .....

City & Zone No.....State.....

☐ **SAVE 35c delivery charges** by enclosing WITH COUPON check or money order for full payment of $5.95 (or Auto Repair Manual (or $8.00 for Truck and Tractor Manual). Same 7-day return-for-refund privilege applies.

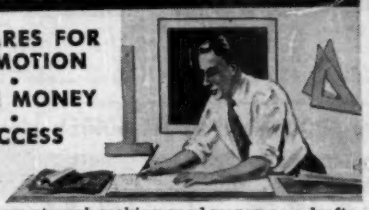
Same FREE 7-Day Offer on MoToR's NEW TRUCK and TRACTOR REPAIR MANUAL

BRAND-NEW! Covers EVERY job on EVERY gasoline-powered truck and farm tractor made from 1936 thru 1949! 1867 pictures, 963 big 8½ x 11-inch pages, 300,000 facts. Used by Armed Forces. All types Gasoline Engines, Fuel Systems, Governors Lubrication Systems, Ignition Systems, Starters, Generators, Clutches, Transmissions, Axles, Torque Dividers, Transfer Cases, Brakes, Steering, etc. Check proper box in coupon for free trial.

C.T.C. TRAINING IN

DRAFTING

PREPARES FOR PROMOTION • MORE MONEY • SUCCESS



"Here I am at work making good money as a draftsman. I'm glad I sent the coupon to Chicago Tech for that Free Trial Lesson and found out how easy it is to learn Drafting in spare time at home. Today, I feel secure in my job. What's more, I feel I'm slated for promotion and more pay."

LEARN IN SPARE TIME—AT HOME!

(or at the College in Chicago)

A few hours of pleasant home study every week—that's all. All the tools you need; drawing outfit included. This tested method—developed over 46 years of C.T.C. progress—prepares men quickly for good positions in industry.

FREE INFORMATION — SEND COUPON

To prove to you how easy it is to learn Drafting at home by the Chicago Tech method, we will send you this FREE TRIAL LESSON. No charge for this lesson, now or later. Fill out and mail coupon, or send post card today.

CHICAGO TECHNICAL COLLEGE

A-228 Tech Bldg., 2000 So. Michigan Ave., Chicago 16, Illinois

Mail me FREE Lesson with information about big opportunities in DRAFTING.

Name.....Age....

Address.....

City.....Zone...State.....

INVENTORS

Before you make any effort to market your invention, you should take the first steps toward proceeding for patent protection.

The usual first step is to have a search of the U. S. patent records conducted, so that I can report to you on the question of patentability.

I shall be pleased to furnish you with information relative to patent procedure upon request from you, and this will be without any obligation on your part.

PATRICK D. BEAVERS
(Formerly RANDOLPH & BEAVERS)
Registered Patent Attorney
937 Columbian Building, Washington 1, D. C.

INVENTIONS WANTED

Cash-in on our connections with prominent manufacturers and national distributors who come to us for new products. We assist you with your invention from idea stage through to developed product. *Full Protection for you.* Write for Booklet "S."

ELO DEVELOPMENT CO.
CHATHAM-PHENIX BLDG.
LONG ISLAND CITY 1, N. Y.

HELP FOR INVENTORS

Hundreds of manufacturers have requested our assistance in locating marketable new products.
Complete information, free.

INSTITUTE of AMERICAN INVENTORS
Dept. 3, 631-E St., N.W., Washington 4, D. C.

PATENTS

C. A. SNOW & CO.
REGISTERED PATENT ATTORNEYS
WRITE FOR INFORMATION TO
426 SNOW BUILDING, WASHINGTON 1, D. C.

PATENTS PATENT LAWYER

GUSTAVE MILLER
REGISTERED PATENT ATTORNEY
PS-11 WARNER BLDG.
WASHINGTON 4, D. C.

ASSOCIATE EXAMINER
U. S. PATENT OFFICE 1922-1929
PATENT ATTORNEY & ADVISOR
U. S. NAVY DEPT. 1930-1947.

Send for PATENT INFORMATION Book and "INVENTOR'S RECORD" without obligation.

INVENTORS

Whether an invention is patentable can be substantially determined by a search of the U. S. Patent records. Without obligation, write for information explaining the steps you should take to secure a patent.

JOHN N. RANDOLPH
Registered Patent Attorney
205 Columbian Building Washington 1, D. C.

INVENTORS

IF YOU WISH TO PROTECT YOUR INVENTION, You should take steps to protect it by a U. S. Patent. Write me for "RECORD OF INVENTION" form.

CARL MILLER
REGISTERED PATENT ATTORNEY
WOOLWORTH BLDG., 35th FLOOR, 11-C
NEW YORK CITY

GET INTO DIESEL-AUTO MECHANICS *Master All Phases*

JOBS LIKE THESE ARE AVAILABLE TO TRAINED MECHANICS. CHOOSE THE FIELD YOU LIKE BEST

Get Complete Training

Diesel Fuel Injection
Automotive Motor Tune-up
Diesel Engine Rebuilding
General Garage Mechanic
Agricultural Implements
Auto Engine Rebuilding
Auto Elec. Service
Public Utilities
Parts Dealers
Bus & Truck Lines
Industrial Maintenance
Contracting & Excavating
Business of Your Own
AND MANY other similar openings.

As a National Schools graduate, you are trained for ALL opportunities in the Diesel & Auto Industries.

EARN WHILE YOU LEARN

With our practical Master Shop-Method Home Training, you study at home in your spare time. You receive Spare Time Work Lessons, which show you how to earn while you Learn . . . for extra money and experience. You Learn by DOING.

TOOLS AND EQUIPMENT

To make your training complete, we give you selected mechanic's tools and equipment, illustrated below, including all-metal tool-box — as a regular part of your instruction.

Shop-Method Home Training by an Established Resident School Prepares you for Many Good Jobs

Opportunity is everywhere for the trained Diesel - Auto Mechanic. Highways throng with cars, busses, trucks tractors. Garages and Service Stations are kept busy. Factories, ships, farms, railroads, general industry, are dependent upon engine power. Here's a dynamic, fast - growing field that needs trained men who know ALL phases: installation, operation, maintenance and repair. Now—National Schools offers you a practical, all-embracing Diesel-Auto Mechanic's Course, including all of these advantages:

Complete training, covering—Diesels, High Speed and Heavy Duty; Semi-Diesels, Gasoline and Special Fuel Engines AND Allied Mechanics.

Basic Lesson Texts
Diesel Installation
Operation—Maintenance
Diesel Chart Manual
Spare Time Lessons
Engine Service Manuals
Engine Repair
Drive Systems
Diesel Electric Power
Thermodynamics

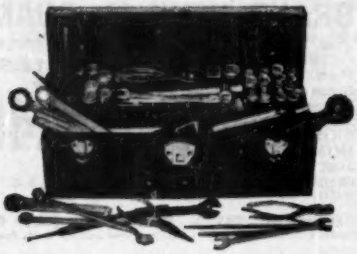
TOOLS AND EQUIPMENT INVESTIGATE

Secure Full Information

NEW, ILLUSTRATED BOOK & SAMPLE LESSON SHOW HOW WE TRAIN YOU...SEND FOR THEM TODAY!

APPROVED FOR VETERANS
Check coupon below

WE GIVE YOU TOOLS OF YOUR TRADE



NATIONAL SCHOOLS

LOS ANGELES 37, CALIF. • EST. 1905

FIND OUT NOW... MAIL COUPON TODAY

NATIONAL SCHOOLS, Dept. 1-PSD
4000 South Figueroa Street
Los Angeles 37, California

(Mail in envelope or paste on penny postcard)

Mail me FREE the book, YOUR FUTURE IN DIESEL-AUTO MECHANICS, together with the Sample Lesson. I understand I may keep and use the information with no obligation.

Name.....Age.....

Address.....

City.....Zone...State.....

☐ Check here if Veteran of World War II

1951 GOVERNMENT JOBS!

RAILWAY
POSTAL
CLERKS

and other
Civil Service
Positions

Start as high as $3,450.00 a Year

(Veterans Get Special Preference)

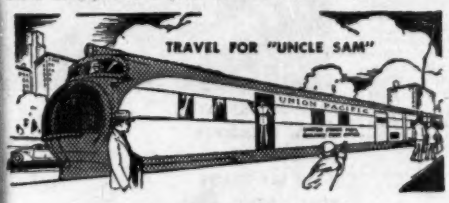
Get Ready Now for 1951 Examinations

City Mail Carriers, Post Office Clerks

Clerks and Carriers now get $2,870.00 the first year of regular employment and automatically increase $100 a year to $3,670.00. Open to Men—Women 18 to 50. Clerks and Carriers can be promoted to other postal positions paying as high as $7,670.00.

Railway Postal Clerks

Railway Postal Clerks get $3,170.00 the first year of regular employment, being paid on the first and fifteenth of each month: ($132.08 each pay day.) Their pay is automatically increased yearly to $3,670.00. Advance may be had to Chief Clerk at $5,970.00 a year. Male Veterans only.



3 Days On—3 Days Off—Full Pay

Railway Postal Clerks on long runs usually work 3 days and have 3 days off duty or in the same proportion. During this off duty their pay continues just as though they were working. They travel on a pass when on business. When they grow old, they are retired with a pension.

Many Other Positions

Many other positions are obtainable. Rural Carriers—Stenographers—Typists—Patrol Inspectors—Assistant Statistical Clerks—etc. Those wishing these positions should qualify at once.

Get Free List of Positions

Fill out the following coupon. Tear it off and mail it today—NOW, at once.

Although not government controlled, this can result in your getting a big paid government job.

FRANKLIN INSTITUTE, Dept. M-80, Rochester 4, N. Y.

Rush to me, entirely free of charge (1) a full description of U. S. Government Jobs; (2) Free copy of illustrated 40-page book, "How to Get a U. S. Government Job" with (3) List of U. S. Government Jobs; (4) Tell me how to qualify for one of these jobs.

Name.....

Street.....

City.....Veteran?.....

Use This Coupon Before You Mislay It. Write or Print Plainly.

LIFETIME WRITTEN GUARANTEE

17-JEWEL WRIST WATCH 14.95 PLUS 1.50 TAX

ORIGINAL PRICE $59
YOU SAVE $44

INCABLOC Shock Protected
WATER-DUST PROOF
Worn by Army, Navy & Marines During War

Luminous dial...Sweep second hand ...Super Accurate...Imported Swiss precision movement and case. You get these men's **New Lifetime Guaranteed** Watches now for a small fraction of the original price. **You save $44,** because we bought-out surplus stock! Don't delay!

Order now . . . while they last

TRIAL OFFER! Wear at our risk!

Money back in 5 days if not delighted. SEND ONLY $1 down payment with order. Pay balance to postman on arrival plus postage. Or we pay postage if you include full payment, plus tax with your order. Return this ad with your order.

FREE Handsome Expansion Band included. ORDER NOW!

MARYLAND DISTRIBUTORS, Dept. 214
501 East Baltimore Street Baltimore 2, Maryland

Free Watch & Diamond Ring Catalog
Practically Wholesale Prices to User Direct

HOME PHOTO LAB & COURSE $4.99!

Complete Home Photo Developing, Printing Lab Outfit at Half the Price Offered in Stores! Includes printer and light box—3 developing trays, 3 packs developer, 3 packs fixer, 25 sheets of 4 x 6 photo paper, stirring rod, safelight, 4 oz. graduate, thermometer, 100 art corners. **Beginning Photography Course and How You Can EARN $25.00 to $50.00 A WEEK** making pictures, photo cards and developing films for others. **Approved by Professionals.** Many boys and girls from 8 years up **learn in a Few Hours! Ideal Start in Photography For Anyone!**

SEND ONLY $1.00 (bill, ck, mo) and pay postman $3.99 plus C.O.D. postage or send $4.99 plus 40c postage for p.p. delivery. ORDER YOUR LAB NOW AND START LEARNING AND EARNING GOOD MONEY IN PHOTOGRAPHY THE FIRST WEEK!

MIDWAY CO. Dept. FPS-1 KEARNEY, NEBRASKA

A "GOOD HAND" HELPS YOU SUCCEED!

LEARN TO WRITE WELL

Handwriting quickly improves with our easy-to-understand picture lessons! Put your spare time to good use; send today for ☐ FREE BOOK, "How to Become a Good Penman", or check volumes wanted below at $1 each: ☐ Business Writing ☐ Artistic Writing ☐ Card Writing ☐ Bird & Design Flourishing ☐ Engrossing Alphabets. COMPLETE SET $4.99

OUR 53rd YEAR

TAMBLYN SCHOOL of PENMANSHIP
S. A. Ziller, Pres. 498 Ridge Bldg., Kansas City, Mo., USA

Learn Watch Repairing

This highly skilled, well paid trade offers unusual opportunities today. Watch repair men are in great demand for repairing watches and for working with the many new, delicate instruments of industry and re-armament. Study at G.I. approved resident school or by low-cost, home study course in your own home. Thorough training. Catalog free. Write Dept. C-11 today.

AMERICAN INSTITUTE OF SPECIALIZED WATCH REPAIR
1012 Franklin Southeast Grand Rapids 7, Mich.

MAIL ORDERS—Postage Prepaid—Money Back Guarantee

U. S. Air Force Surplus—All Brass

BRAND NEW! 1½ QUART

Just like the HAND PUMP FIRE EXTINGUISHER you see in Public Bldgs., Warehouses, etc. Made by best known Fire Extinguisher Manufacturers. Every CAR, TRUCK, GARAGE, HOME should have one. Just fill with carbon tetra-chloride. Complete with wall bracket.

Cost $18.50
New
$4.49

Universal Enterprises, 946 S. Main, Los Angeles, Cal.
We Pay Taxes, Insurance, Postage. Calif. residents add 3% Sales tax

Select DRAFTING FOR A HAPPY and SUCCESSFUL FUTURE

All New Developments
All New Improvements

Start with the DRAFTSMAN!

FROM the building of a pin to the erection of giant skyscrapers DRAFTSMEN are important factors. Before production comes "tooling up" and before tooling first comes Drafting and Designing. Be it mechanical, architectural or structural, draftsmen are needed.

Machines cannot replace the draftsman. His "know how" is needed by all of industry.

This vitally important field in this most highly industrialized country is open to you if you will act.

Consider how the automotive industry redesigns cars year after year. All mass market fields do. Compare yesterday's housing and household goods with today's housing and goods. Then you will see why more draftsmen are always needed.

"The World of Tomorrow" book (illustrated) is yours for the asking. Learn the opportunities offered by Drafting and Blue Printing. Your future may depend upon it. Act today.

BIG MONEY

SALARIES

Trained draftsmen command big wages. Are constantly needed to create new products, improve current methods. The "Draftsman's know how" saves thousands of dollars, saves thousands of hours. He is well paid.

YOUR OWN BUSINESS

Independence, Security is yours when you head your own drafting or engineering firm. Again it is "know how" that pays you big profits, year in—year out. Makes you always in demand.

Learn drafting at home in your spare time the new improved CHRISTY way. By working with actual problems. Actually designing equipment. Trained by making drawings and mastering all types of drafting problems. Christy graduates are ready for immediate employment as skilled draftsmen.

SEND FOR THIS FREE BOOK TODAY!

CHRISTY TRADES SCHOOL, Dept. DB-504
4432 N. Kedzie Ave., Chicago 25

Rush me FREE book "The World of Tomorrow" and how your Home Training professional Drafting Instruments, Drafting Table, Drafting Equipment can be had on a PAY AS YOU LEARN plan.

NAME.....Age.....

ADDRESS.....City.....State.....

WE GIVE YOU!

- Professional Drafting Set (complete)
- Draftsmen's Table (Portable & Folding)
- Lesson Manuals
- T-Square Tru-Edge
- Transparent Angles 45°, 60°
- French Curve, Shield, Compass
- Drawing Paper, Ink, Pencils, etc.

YOU can acquire

LAW NIGHTS AT HOME! L L.B. DEGREE

LaSalle's famous Law Library—used as reference in many Law libraries and Law offices—has enabled thousands to master Law surprisingly fast, in spare hours at home, for business and professional advancement.

These 14 remarkable volumes, compiled by leading professors and lawyers, cover the whole basic field of Law in condensed, orderly, simplified manner.

You advance rapidly with this great library, plus special lectures furnished. We guide you step-by-step with personalized Problem Method of instruction . . . you *learn by doing*—handling legal problems—not by memorizing rules.

Send for two FREE 48-page booklets, "Law Training for Leadership," and "Evidence," answering questions about Law and its value to you, and telling how LaSalle Law graduates are winning rapid advancement in business and public life. Mail coupon below. No obligation.

LA SALLE EXTENSION UNIVERSITY
A Correspondence Institution

417 S. Dearborn St. Dept. 183L Chicago 5, Ill.

Send me your two FREE booklets described above, without obligation.

Name.....*Age*.....

Street.....

City, Zone & State.....

ENGINEERING DEGREE IN 27 MONTHS

Big Demand for Graduates

AERONAUTICAL, CHEMICAL, CIVIL, ELECTRICAL, MECHANICAL and RADIO ENGINEERING (including Television).

Hundreds of young men are earning engineering degrees in this recognized institution each year—continuous operation. New terms start quarterly. Many students earn a major part of their college expenses in this large industrial center.

Low tuition. Competent instruction. Thorough, intense, practical program. Modern laboratory facilities including new physics lab. and modernized wind tunnel. Individualized instruction emphasized.

Approved for Veterans. Engineering preparatory courses. Students from 48 states and 21 foreign countries. Enter March, June, September, December. Send coupon for free catalog and full information. Enroll now.

SEND COUPON TODAY

INDIANA TECHNICAL COLLEGE
611 E. Washington Boulevard
Fort Wayne 2, Indiana

Please send me free information on B. S. Engineering degree in 27 months as checked.

☐ Aeronautical, ☐ Chemical, ☐ Civil,
☐ Electrical, ☐ Mechanical, ☐ Radio-Television.

Name.....

Address.....

MEN! WOMEN!
New Car given as Bonus!

TAKE ORDERS for Nationally Advertised

NYLONS

GUARANTEED NINE MONTHS

Sensational Guarantee creating a tremendous demand for Wilknit Nylons! If they run, wear out or even snag from any cause whatever . . . within NINE MONTHS . . . depending on quantity . . . they are replaced FREE OF CHARGE. No wonder it's easy to quickly build up fine, steady, year-'round income. Earnings start immediately. Look at these exceptional figures—Ralph Shearer made $67.11, first week—Mrs. Paul Estes, $42.92—Mrs. Ivey Gentry, $43.57. Doris Jensen in addition to making as much as $17.00 in a single day, earned two cars as EXTRA BONUSES. Learn how you can make money in your full or spare time without a bit of previous experience.

EARNED TWO NEW CARS . . . and as much as $120.00 in one week
That's the exceptionally fine record of Chas. Mills with the famous Wilknit hosiery line. Offer of New Chevrolet as a bonus open to EVERYONE. Send name for facts FREE.

SEND NO MONEY . . . *Just Hose Size*

When you send for Selling Outfit, I also send your choice of Nylons or Socks for your personal use. Don't lose a minute. Rush name on penny postcard for full money-making facts on Sensational Sales Kit. Send hose size, too. Lowell Wilkie,
WILKNIT HOSIERY CO., 321 Midway, Greenfield, Ohio

MONEY TO MEN ALL DATA FREE

THE PLASTEX Industry needs manufacturers on small scale and for big production of Lamp and Clock Stands. Art Goods and Novelties in Plastex and Marble imitation. Experience unnecessary. ½c material makes regular 10c store sellers. Rubber moulds furnished for speed production. Small investment brings good returns. We are now placing big chain store orders with manufacturers. Ambitious men have chance for real prosperity. Our Free booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. 2, 3480 Third Ave., New York 58, N. Y.

LEARN MEAT CUTTING
At Home—In Spare Time

Get into the vital meat industry. Concise, practical Home Training based on 25 years proven instruction methods used at National's famous resident school. Prepares you for bigger pay as Meat Cutter, supervisor, market manager or more money in your own store. Go as rapidly as your spare time permits. Diploma. Start NOW to turn your spare hours into money. Send for FREE bulletin today. No obligation.

National School of Meat Cutting, Inc., Div. O-98, Toledo 4, Ohio

"How to Make Money with Simple Cartoons"

A book everyone who likes to draw should have. It is free; no obligation. Simply address

FREE BOOK

CARTOONISTS' EXCHANGE
Dept. 191D Pleasant Hill, Ohio

BIG PAY TRADE

AIR-CONDITIONING REFRIGERATION
Mastered by Mail

HOME STUDY COURSE

Teaches Air Conditioning and Refrigeration . . . the field of the future with a future. Get in now on the ground floor.. Restaurants, taverns, stores, theaters, etc., all need and are installing air conditioning. Maintenance men will be needed for Big Pay Jobs. Learn at Home in your spare time. Two weeks practical training period in our great modern shops in Baltimore. Room and board included in course. For details write

AIR CONDITIONING & REFRIGERATION INSTITUTE
Dept. S, 110-112-114 N. Paca St. Balto. 1, Md.

LEARN ELECTRIC MOTOR REPAIR!

...A GOOD PAYING, UNCROWDED PROFESSION

It pays to train for something different—something that not everybody and his brother are learning—something for which rich opportunities exist everywhere! Every day, more and more electric motors and control systems are being used, BOTH in industry and home appliances. The expert who can install, and repair them is a valuable well-paid man. The field is tremendous. Trained men find part or full-time opportunities everywhere. ELECTRIC MOTOR REPAIR, the big, 560-page training course book, teaches you the work step by step—without previous experience.

ONLY $5 FOR THE COMPLETE TRAINING

LEARN FAST . . . *No lessons to wait for*

Based on what you can learn rapidly at home from ELECTRIC MOTOR REPAIR book, you can train for prompt, profitable installation, servicing, repairing and complete armature rewinding of practically any electric motor in use today. You learn fast! You learn right! Every subject is clearly explained by text AND ALSO by more than 900 clear-cut illustrations and diagrams. You not only read what to do—you also see in pictures exactly how to do it. An instructor standing at your side could hardly do better! You learn about all sizes of motors from those used on vacuum cleaners or refrigerators to giant industrial motors. Quick reference guides explain many specific jobs on common motor types. When such a motor comes in for repairs, just look it up in the book!

COVERS ALL ELECTRIC MOTOR TYPES

In short, ELECTRIC MOTOR REPAIR covers the entire field from alternating- to direct-current motors and generators PLUS mechanical, electrical and electronic motor control systems.

Unique Duo-Spiral Binding divides the book into two sections so that both text and related diagrams can be viewed together. Thousands of copies are already in use in leading vocational schools, in busy motor shops for day-to-day reference and, most of all, in homes for study by those who want to cash in on this fast-growing field.

MAKES THIS INTERESTING WORK EASY TO LEARN!

Written by one of the nation's leading motor repair instructors, ELECTRIC MOTOR REPAIR starts right at the beginning—with basic facts about motor operation and construction. Then it proceeds to make even the most complicated parts of the work perfectly understandable. If sold as a correspondence course and sent to you in lesson form, you'd regard it as a bargain at 10 times the price. Instead, you buy it for only $5 and get it all at once. Many have completed it in a few short weeks. Here are just a few of the basic subjects covered:

- Split-Phase Motors
- Capacitor Motors
- Repulsion-Type Motors
- Polyphase Motors
- Alternating-Current Motor Controls
- Direct-Current Motors
- Direct-Current Motor Armature Winding
- Direct-Current Motor Controls
- Universal, Shaded-Pole and Fan Motors
- D-C Generators
- Synchronous Motors and Generators
- Electronic Motor Controls, etc., etc.

FREE STUDY GUIDE!

A unique home study Guide Book including 500 practical repair questions—priced and sold separately at 25c—is FREE with your request to examine ELECTRIC MOTOR REPAIR book. Makes learning easier. Speeds up your training.

PRACTICE FROM IT FOR 10 DAYS

. . . *at our risk!*

Send coupon today! See for yourself that really good home study training doesn't need to cost you a lot of money. If not more than satisfied, return ELECTRIC MOTOR REPAIR to us and we will refund your $5 promptly and no questions asked.

MAIL ORDER! *You Can't Lose!*

Dept. PS-11, MURRAY HILL BOOKS, Inc.,
232 Madison Ave., New York 16, New York

☐ Send me a copy of ELECTRIC MOTOR REPAIR book for which I enclose $5 ($5.50 outside U.S.A.); or ☐ send C.O.D. and I will pay postman this amount plus postage. If book is not what I want, I'll return it within 10 days and you guarantee to return my $5. Include a FREE copy of the STUDY GUIDE which will be mine to keep whether or not I decide to keep the ELECTRIC MOTOR REPAIR book.

(Cash only outside U.S.A.—same return privilege.)

Name .....

Address .....

City, Zone, State .....

AVIATION TRAINING

ESSENTIAL in peace or war

The aviation industry urgently needs properly trained young men for essential civilian aviation positions. Embry-Riddle offers maximum training in minimum time. Fully accredited 8-mo. to 26-mo. courses in all aeronautical phases. Thorough, practical instruction backed by 25 yrs. experience training today's aviation leaders. Complete school campus.

Send coupon today!

Embry-Riddle
Address Registrar
SCHOOL OF AVIATION
DEPT. 91 MIAMI 30, FLORIDA

Please Print

NAME _____

ADDRESS _____

City _____

State _____ Age _____

I am interested in...

- ☐ A.&E. Mechanic
- ☐ Commercial Pilot
- ☐ Engineering
- ☐ A.&E. Combined Commercial Pilot
- ☐ Flying Mechanic
- ☐ Drafting & Design

Check One { ☐ Veteran ☐ Non-Vet

TRAIN IN MIAMI--AIR CAPITAL OF THE WORLD

KEEP FORDS ALL FORD
with GENUINE FORD PARTS

•

Made Right to Fit Right to Last Longer

MEN WANTED as Local Manufacturers of New Masonry Wall Unit

CAVITEX is today's masonry—colorful, streamlined, scientific. Yet with price appeal to override competition. Size and proportion in direct line with modern architectural trends. Dimensions strictly according to modular standards. All the strength, safety and endurance of masonry at its peak point.

Outstanding Opportunities For Men of Vision—Cavitex can be made locally—of local materials, with local labor. Freight and distribution costs are saved. That's why Cavitex can be sold so low, yet still allow 100-150% mark-up on basic costs. Plants are compact, self-contained, require no skilled labor. We supply complete equipment—cash or time. Hundreds of territories open. Tie in with Cavitex and ride the tide of biggest building cycle in history. Write for full information at once.

W. E. DUNN MFG. CO.
410 W. 24th ST. HOLLAND, MICH.

New FALSE PLATE for OLD IN 24 HOURS

Low As Only $15.95

***Wonderful New Scientific Method Transforms OLD, LOOSE, Cracked or Chipped Plates into* LUSTROUS BEAUTY-PINK DUPONT PLASTIC PLATES**

MONEY BACK GUARANTEE

Why envy beautiful false teeth of others? We will transform your old, loose, cracked or chipped plate into a beautiful new, lightweight DuPont Beauty-Pink Plastic Plate, using your own teeth. All missing and broken teeth matched and replaced. Your cost amazingly low; actually save many dollars. No impression needed under our new scientific False Plate Method. 24-Hour Service.

SEND NO MONEY Enjoy life again, and save money on beautiful, new, natural-looking **plastic** plate. Rush name, address for full details sent FREE. If your plate is *loose*, we show you how to make it comfortable, tight-fitting before duplication.

West Dental Laboratory, 127 N. Dearborn St., Dept. C-34, Chicago 2, Ill.

CARBURETOR TOO RICH MAKES MOTORIST TOO POOR

Car owners who are wasting money and not getting proper gas mileage due to over-rich mixtures will be pleased to learn how to save gasoline by VACU-MATING over-rich mixtures. VACU-MATIC fits all cars, trucks and tractors. It is *automatic* and operates on the supercharge principle. Easily installed in a few minutes.

SALESMEN WANTED! Big Profits! Send name, address on penny postcard for *free particulars* and how to get yours for introducing.

VACU - MATIC CO., 7617 - 1705 W. State St., WAUWATOSA, WIS.

Learn BAKING *at home*

Baking is one of America's high industries in wages. Not seasonable, but year 'round good field for trained and experienced men. Thorough basic spare time home study course lays solid foundation. If you have the aptitude for this type of work, send for FREE Booklet, "Opportunities in Commercial Baking."

NATIONAL BAKING SCHOOL
835 Diversey Parkway, Dept. 1361, Chicago 14, Ill.

SHORTHAND IN 6 WEEKS AT HOME

Famous Speedwriting system. No signs; no symbols; no machines. Uses ABC's. Easy to learn, write, transcribe. Low cost. 100,000 taught by mail. Also typing. 28th year. Write for FREE booklet to

Speedwriting®
Dept. 2601-1
55 W. 42nd Street, N. Y. 18

I need 500 Men to wear SAMPLE SUITS!

Pay No Money—Send No Money!

My plan is amazing! Just take a few easy orders for my sensational values in made-to-measure suits. Get your own suits WITHOUT A PENNY COST and make money too! Men can't resist the outstanding style, long wear and low price of my made-to-measure suits. You need no experience. Spare time pays big profits. Rush name and address today for complete details, big FREE SAMPLE OUTFIT contains more than 100 actual woolen samples, style illustrations, etc. Write today!

W. Z. GIBSON, Inc., Dept. N-520
500 South Throop St., Chicago 7, Illinois

Now You Can Write Your Own Ticket In This ESSENTIAL Industry

4 Easy Steps to Big Money IN Television-Radio!

Complete Self-Training Course in TELEVISION and RADIO Prepared by Experts—Starts from Scratch, Takes You BY SIMPLE LOGICAL STEPS From Basic Theory to Advanced Problems of Repair, Installation, Televising, Color TV, etc.

NOW you can do ANY TV-Radio installation, service, or repair job; operate field-testing equipment; understand problems of TV broadcasting, FM-AM transmission, etc. Step into a good paying job in the booming electronic field. Get a specialist's rating—or start your own service business. Train yourself AT HOME . . . IN YOUR SPARE TIME . . . with the McGraw-Hill Basic Course in TV and Radio.

2296 PAGES—1611 ILLUSTRATIONS

Complete 4-volume course by outstanding radio and TV instructors. Every detail clearly explained in over TWO THOUSAND PAGES of step-by-step instruction and over SIXTEEN HUNDRED "how-to-do-it" illustrations, cross-section diagrams, etc. The review questions and answers "nail down" everything you learn. At-a-glance "trouble-shooting" charts show how to diagnose instantly any radio or TV breakdown, how to repair it expertly, quickly.

Pays for itself many times over. Can qualify a beginner for FCC's 1st Class License test; gives an experienced technician more confidence, shows him new tricks.

SEND NO MONEY

Over 8 million TV sets . . . over 60 million radios in the country. The shortage of skilled workers is critical. Men who know electronics can write their own ticket . . . in Government OR private enterprise! They are ESSENTIAL! The McGraw-Hill TV-Radio Course can get you into electronics—put you in line for success in America's fastest growing industry!

Mail coupon to examine complete four-volume course FREE for 10 days. No obligation. With course, you get ABSOLUTELY FREE a valuable illustrated book, "Successful Soldering." (reg. price: $2.00)

Or you may examine individual books FREE for 10 days by checking the proper boxes in coupon. McGraw-Hill Book Co., Inc., Dept. PS-1, 327 W. 41st. St., New York 18, N. Y.

ABSOLUTELY FREE

. . . whether or not you keep the course, "Successful Soldering" (reg. price: $2)

All about: Soldering coppers; fluxes. Tinning; sweating; stainless-steel, other special solders, etc. Many illustrations.

PARTIAL CONTENTS

BASIC TELEVISION, 502 pages, 415 illus.
Scanning • Synchronizing • Video Signal • Brightness • D-C Reinsertion • FM Alignment • Picture Tubes • VHF and UHF transmission • Reception • Deflection Generators, Circuits • Antennas • Frequency Modulation • Power Supplies • Color TV • etc.

TELEVISION SERVICING, 429 pages, 388 illus.
Antennas • Transmission Lines • Test-pattern, Analysis • Reception Troubles • Interference • Deflection Circuits • Video Detection • Alignment • Cathode-Ray Tube • Power Supplies • etc.

ESSENTIALS OF RADIO, 800 pages, 433 illus.
Circuit Analysis • Vacuum Tubes • Power Supply, Transmitting, Receiving • Test Equipment, Audio Units • Frequency Stability • Microphones • Transmission • etc.

RADIO SERVICING, 475 pages, 375 illus.
Multimeters • AC Power Supply • Speakers • Antennas • Push-Pull Output Stage • Detector Stage—AVC • Converter Variations • etc.

FREE 10-DAY TRIAL COUPON

McGRAW-HILL BOOK CO., Inc., Dept. PS-1
327 West 41st St., New York 18, N. Y.

Please send me for 10 days' FREE EXAMINATION
☐ **McGraw-Hill's Basic Course in Radio & TV** . . . including **Essentials of Radio, Elements of Radio Servicing, Basic Television, Television Servicing** (Total retail price of the four books is $22.50—Special Course Price: Only $19.95 in easy installments). Also send ABSOLUTELY FREE, "Successful Soldering." If not satisfied with course, I will return the four course books; pay nothing; and keep "Successful Soldering" free. Otherwise, I will send you only $1.95 plus postage then; and the balance in 6 monthly installments of only $3.00 each.

If you wish to examine any of these books individually, check below the ones you wish us to send you for 10 Days' FREE EXAMINATION:

☐ **Essentials of Radio, $5.00**
☐ **Basic Television, $6.50**
☐ **Elements of Radio Servicing, $4.50**
☐ **Television Servicing, $5.00**

For whichever of these books I decide to keep, I will send you $2.00, plus postage, at the end of 10 days; balance in easy monthly installments.

Name.....

Address.....

City.....State..... PS-1

☐ **WE'LL PAY POSTAGE** if you enclose first payment of $1.95 when ordering the course, or the full price of book when ordering individual books (see prices above). Same 10-Day Return Privilege for full refund.

I HELPED T.E.H. MAKE $14 A DAY WHILE STILL LEARNING!

T. E. H.—West Virginia: "By the time I finished half your course, I was making $14.00 per day. I have made enough on the side to more than pay for the course."

H. T. ARMSTRONG

Learn ELECTRIC APPLIANCE REPAIR & SERVICE

WE TEACH:
How to Repair
Washing Machines
Vacuum Cleaners
Electric Ranges
Lamps, Motors,
Irons, etc.,
REFRIGERATION
and
House Wiring
At Home
In Your
Spare Time!

For a man handy with tools, and happiest when working with his hands, OPPORTUNITY is Wide Open Today in this great and growing field. Everyone is a customer for the man trained to service electric appliances.

Open Your Own Shop

Our practical HOME COURSE teaches you this business from A to Z—preparing you to take a well paid job or open your own shop. You can actually start in your basement or garage with the tools we send you . . . before finishing.

We Include An ELECTRICAL APPLIANCE TESTER A Big Kit of Tools—NO EXTRA COST

MAIL THIS COUPON for FREE BOOK

H. T. ARMSTRONG
PACIFIC TRAINING SCHOOLS
7217 So. Broadway, Dept. S-511 Los Angeles 3, Calif.
Dear Sirs: Please send me, without obligation, your free booklet and complete details.
Name_____
Address_____
City_____ Zone____ State____

TUNE IN THE AUTO-LITE SHOW

"Suspense!"

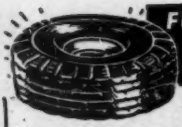
TUESDAY NIGHTS-CBS-TV • THURSDAY NIGHTS-CBS

Prints & Illustrates 1¢ Post Cards

FREE Learn *how* thousands of business men, in every line, are boosting sales in spite of conditions—with 1¢ messages—printed and illustrated in a few minutes on gov'nt post cards—with amazing new patented **CARDMASTER.** Your "today's" ideas, read by your prospects next morning. Not a toy, but a sturdy advertising machine, built to last for years. Low price, sold direct. Guaranteed for five years. Send name today.

SEND NAME We'll send **FREE** illustrated book of money-making IDEAS for your business and complete, unique advertising plans. RUSH YOUR NAME TODAY.

CARDMASTER COMPANY
1920 SUNNYSIDE, Dept. 161, CHICAGO 40, ILL.



FULLY GUARANTEED TIRES COST LESS!

Nationally famous **FIRESTONE, GOODRICH, U.S. ROYAL, GOODYEAR,** and other makes. Every tire selected and inspected for your safety.

SALE SALE

NEW TREAD TIRES GUARANTEED 24 MONTHS

600x16	7.98	650x16(6)	12.98	650x15	10.48	670x15	9.98
600x16(6)	9.98	700x16	11.98	700x15	11.48	710x15	11.98
650x16	10.98	550x17	7.98	700x15(6)	13.48	760x15	12.98

SNOW TIRES—Add $2.00 More to Above Prices

GOOD TIRES GUARANTEED 12 MONTHS

600x16	4.14	700x16	5.14	32x6(8)	8.84	825x20	14.24
650x16	4.54	670x15	4.74	32x6(10)	10.84	900x20	13.34
650x15	4.34	650x20	7.64	750x20(8)	8.54	1000x20	14.14
700x15	4.64	700x20(8)	8.94	750x20(10)	9.54	1100x20	16.1-

AAA PREMIUM GRADE GUARANTEED 18 MONTHS

600x16	5.28	710x15	5.68	650x20	9.88	825x20	15.68
650x16	5.88	600x16(6)	5.88	700x20	10.88	900x20	15.58
650x15	5.68	700x15(6)	6.98	32x6(8)	10.48	1000x20	16.48
700x15	5.88	760x15	6.28	32x6(10)	12.48	1100x20	17.58
700x16	6.18	550x17	5.68	750x20(8)	11.48	1100x22	16.78
820x15	6.98	600x20	8.88	750x20(10)	13.48	1400x20	31.98

MILITARY SPECIAL

AA Guaranteed 12 Months—

900x16	9.58	1000x20	16.48
750x20	9.68	1100x20	18.48

New Tread Guar. 24 Mos.

600x16	8.98
600x16 (6)	10.98
750x20	24.98

AAA GUARANTEED 18 MONTHS

900x16	12.49	750x20	13.98

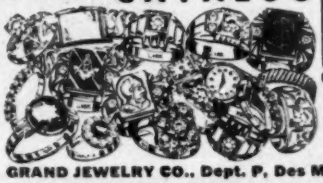
Passenger Tubes—Water Tested—All Sizes . . . $1.25
Truck Tubes—Water Tested—All Sizes $2.95

Largest stock of used tires in the East. Thousands of satisfied customers. Write for sizes not listed. MONEY ORDER OR CHECK WITH ORDER.

PYRAMID TIRE CO.
1333-35 North 5th St.
Dept. M., Phila. 22, Pa.

LENNA'S LARGEST STOCK OF USED TIRES

FREE JEWELRY CATALOG



BUY DIRECT AND SAVE

Quality merchandise from an old reliable firm. Satisfaction guaranteed.

GRAND JEWELRY CO., Dept. P, Des Moines 11, Iowa

LEARN MOVIE PROJECTION THEATRE MANAGEMENT

The Motion Picture Theatre Business offers big opportunities for trained men. Get into a fascinating field with a peace time future. Train at home in spare time. Free catalog. Established 24 years.

THEATRE INSTITUTE, 385 Washington St., Elmira, New York

Rupture Troubles Ended

Advanced method has healed thousands. No leg straps, no elastic, no plasters. No pressure on hips or spine. Flexo-pad. Entirely different. Endorsed by doctors, mechanics, clerks. Very light. **INEXPENSIVE. GUARANTEED.** Write for information and trial.

SMITH MANUFACTURING COMPANY
EST'D 1893 Dept. PS, Preston, Ont. Can.

START A BUSINESS MAKING

Concrete Blocks

New superior method makes square, true, easy-to-lay, modern blocks. Will pass building code. High production, big profits. One $30 machine will make four 5"x8"x12" blocks per minute—1000 per day. Can pay for itself in a day. Sell blocks, or save ⅔ building cost by making and laying your own. Money back Guarantee. Send Postcard for Free Catalog.

Economy Manufacturing Company
DEPT. S. STONE MOUNTAIN, GEORGIA

THOUSANDS NOW PLAY

who never thought they could!

After Ten Months Plays in Band

I had no idea I would accomplish so much musically. After only ten months I was playing in bands. I now am employed in a music store as an instructor. This I owe to your marvelously simple lessons.
*B. C., Paterson, New Jersey

Wouldn't Take $1000 for Course

The lessons are so simple that anyone can understand them. I have learned to play by note in a little more than a month. I wouldn't take a thousand dollars for my course. *S. E. A., Kansas City, Mo.

Shares Course With Sister

The teaching is so interesting and the pieces so beautiful I couldn't ask for anything better. I recommend your course highly. My sister shares it with me and feels the same way. *D. E. G., Wausau, Wisc.

Lots of Fun

The progress I have made is thrilling. I'm on Lesson Seven and tossing off "Little Buttercup" like a maestro. The course is easy and what is most important—lots of fun.
*B. B., Jr., Hartford, Connecticut

Plays After 2 Months

I hesitated before sending for your course because of an earlier experience I had with a course by ear from another company. I am playing pieces now I never dreamed I would play after only two months.
*E. T., Prichard, Ala.

*Actual pupils' names on request. Pictures by professional models.

You, too, can play any instrument By this EASY A-B-C Method

YOU think it's difficult to learn music? That's what thousands of others have thought! Just like you, they long to play some instrument—the piano, violin, guitar, saxophone or other favorites. But they denied themselves the pleasure—because they thought it took months and years of tedious study to learn.

Learn in Spare Time at Home

And then they made an amazing discovery! They learned about a wonderful way to learn music at home—without a private teacher—without tedious study—and in a surprisingly short time. They wrote to the U. S. School of Music for the facts about this remarkable short-cut method. And the facts opened their eyes! They were amazed to find how easy it was to learn.

The result? Over 950,000 men and women have studied music at home this simple, A-B-C way. Now, all over the world, enthusiastic music-lovers are enjoying the thrilling satisfaction of creating their own music. They have found the key to good time, popularity and profit.

Costs Only Few Cents a Day

And that's what you can do, right now. Get the proof that you, too, can learn to play your favorite instrument—quickly, easily, in spare time at home for only a few cents a day. Never mind if you have no musical knowledge, training or talent. Just read the fascinating booklet and Print and Picture sample that fully explain all about the famous U. S. School method. Instruments supplied when needed, cash or credit. If interested tear out the coupon now, before you turn the page. U. S. School of Music, 81 Brunswick Bldg., New York 10, N. Y. (53rd year)

FREE!
Print and Picture Sample

NOTICE!
Please don't confuse our method with any systems claiming to teach "without music" or "by ear." We teach you easily and quickly to play **real music**, any music by standard notes—not by any trick or number system.

U. S. SCHOOL OF MUSIC,
81 Brunswick Bldg., New York 10, N. Y.

I am interested in music study, particularly in the instrument checked below. Please send me your free illustrated booklet "How to Learn Music at Home," and your free Print and Picture Sample. (Instrument supplied when needed, cash or credit.)

Piano	Saxophone	Clarinet	Practical
Guitar	Trumpet, Cornet	Trombone	Finger
Hawaiian	Organ	Flute	Control
Guitar	Tenor Banjo	Modern	
Violin	Ukulele	Elementary	Piccolo
Piano Accordion		Harmony	Mandolin

Mr.
Mrs. ..... Have you
Miss (Please print) Instrument? .....

Address .....

City ..... State .....

NOTE: If you are under 16 years of age, parent must sign coupon.

SAVE 2c—STICK COUPON ON PENNY POSTCARD

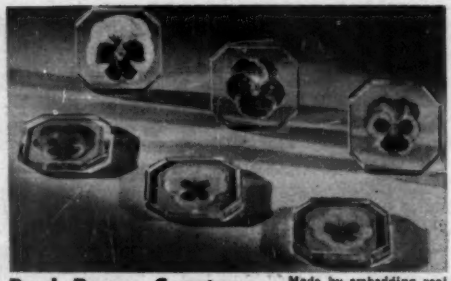
ABOUT HEART WEAKNESS

Bernarr Macfadden, at 81, astonished the entire medical world by leaping into the air at 3000 feet in a parachute jump and landing without injury.

As an advisor in health-building he has had 65 years' experience as a student-teacher, and for more than 15 years was an acting supervising practitioner in large sanatoriums, never losing as a publisher his intense interest in natural health-building.

Although thousands sought his advice, he had personal experience in rebuilding his own heart and he claims that at this time his heart is stronger than it was 25 years ago. He discovered a method through the science of Kinestherapy that can be depended upon to greatly strengthen this vitally important organ.

If you are enduring discomfort of any kind in the upper left chest—the location of the heart—send a postal card to Bernarr Macfadden Foundation, Inc., Dept. 161, 220 East 42 Street, New York 17, N. Y., and information will be sent you that may ultimately be life saving in character.



Real Pansy Coasters Made by embedding real pansies in Castolite, a new liquid casting plastic. You can embed real flowers, butterflies, shells, medals, etc., to make unusual jewelry, buttons, trays and many other distinctive objects. Use home tools. Write for new FREE folder "Liquid Magic" showing things you can make. Many ideas for extra cash in 1951.

The Castolite Co., Dept. A-2, Woodstock, Ill.

MECHANICAL DENTISTRY

A profession offering unlimited opportunities. Most modern and complete course embracing every branch from Plate to Porcelain Work, which prepares you to work for Dentists or start your own business. Individual instruction—practical training in day or night school. No books—no classes. Catalog upon request.

McCARRIE SCHOOL of Mechanical Dentistry
207 N. Broad Street Dept. 906 Philadelphia, Pa.

Learn CARPENTRY BRICK LAYING

Get into the billion dollar building trades. Learn now while opportunities are greatest. Train in our completely equipped shops under expert instructors. G.I. Approved. Enroll now. Limited Classes. Write for FREE catalog.

MIDWEST SCHOOL OF BUILDING TRADES, Dept. PS-1
411 N. Center St. Bloomington, Ill.

TALK TO THE WORLD!

GET YOUR F.C.C. AMATEUR RADIO LICENSE

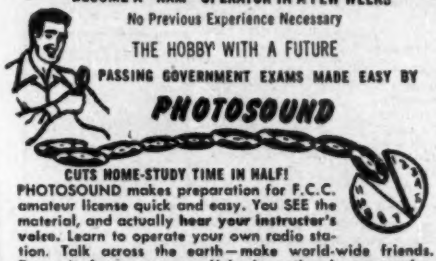
BECOME A "HAM" OPERATOR IN A FEW WEEKS

No Previous Experience Necessary

THE HOBBY WITH A FUTURE

PASSING GOVERNMENT EXAMS MADE EASY BY

PHOTOSOUND



CUTS HOME-STUDY TIME IN HALF!

PHOTOSOUND makes preparation for F.C.C. amateur license quick and easy. You SEE the material, and actually hear your instructor's voice. Learn to operate your own radio station. Talk across the earth—make world-wide friends. Transmit from your car. Help in national emergencies. Enjoy this fascinating, useful and entertaining hobby!

Get full details and three free booklets NOW!

"OPPORTUNITIES IN ELECTRONICS" | F. C. C. EXAMS MADE EASY | SAMPLE F. C. C. EXAM

Mail Coupon

FREE

ELECTRONIC TECHNICAL INSTITUTE Dept. PS-120
769 Venice Blvd., Los Angeles 15, Calif.
Gentlemen: Please send me free of charge your three-in-one booklet, "F.C.C. Exams Made Easy", "Opportunities in Electronics", and "Sample F.C.C. Exam." I am interested in the F.C.C. AMATEUR ( ) COMMERCIAL ( ) Licenses.

NAME..... AGE.....
ADDRESS.....
CITY..... ZONE..... STATE.....

LEARN AT HOME LOCKSMITHING

YOU CAN EARN BIG MONEY ALL YEAR ROUND IN FULL OR SPARE TIME!

Locksmiths are always in big demand! Age or physical handicap is no disadvantage in this respected, permanent field. Learn how to make keys, fix locks, make duplicates, etc. Practical, illustrated lessons by experts show you how! All materials and special tools supplied. Send for FREE booklet.

LOCKSMITHING INSTITUTE, Dept. PS-13
55 Park Ave., Rutherford, N. J.

FREE—Amazing Book on RHEUMATISM, ARTHRITIS

If you suffer the aches, pains and discomforts of Rheumatism, as manifested in ARTHRITIS, NEURITIS, SCIATICA or LUMBAGO, send today for the FREE Book. It reveals important facts about why drugs and medicine give only temporary relief without removing causes. Explains fully a proven, specialized system of treatment that may save you years of distress. No obligation. Write for this FREE Book today!

BALL CLINIC, Dept. 36, Excelsior Springs, Mo.

Get into Good Paying AUTO BODY and FENDER WORK

Big demand in Auto Body and Fender work. Start training now spare time at home for good pay work. Practical shop experience included. U.E.I. Training covers metal work, welding, painting, etc. Placement service—or we will show you how to start your own shop. Behind U. E. I. TRAINING is a large national organization founded 1927. Write today for FREE facts—no obligation.

Write for facts

Auto-Crafts Division, UTILITIES ENGINEERING INSTITUTE
2523 SHEFFIELD AVE., DEPT. XM-6, CHICAGO 14, ILL.

TO HELP YOU PREPARE FOR ONE OF THE BETTER JOBS IN *BUSINESS* or *INDUSTRY*

You can take subjects which have *Real Job Value* and still earn graduation!

• This is *your* opportunity to make completion of high school *work* for you. Your AMERICAN SCHOOL home study course can include high school subjects closely related to your present job or the kind of work you want to do later. Not only can you qualify for your high school course diploma but you can benefit from course subjects that will aid greatly in winning promotions.

50 Job Help Subjects from Which to Choose

Our FREE, 44-page book of detailed information lists 100 high school subjects, of which 29 are technical and 21 are commercial. Whether you work in a shop, factory, garage or office you will find subjects of practical benefit in your climb toward better jobs at better pay. Some of these are Blueprint Reading, Mechanical and Machine Drawing, Tool Making, Foundry Work, four Automotive subjects, Electricity, Carpentry—and Bookkeeping, Accounting, Secretarial Practice, Office Machines, Salesmanship.

Turn Spare Time Into Money

During more than 50 years American School has helped thousands to reach higher job goals by profitable use of spare time at home—and it can help *you*. Others have prepared for college entrance. If you have not completed high school, check that subject on the coupon below, add your name and address and mail it *right now*. Or if you are a high school graduate and are ambitious to succeed in the vocation of your choice, check that subject. Your coupon will bring you the book of information, without obligation of any kind. Mail it *now*.

PRACTICAL, EFFECTIVE HOME-STUDY TRAINING SINCE 1897

AMERICAN SCHOOL

Dept. G146, Drexel at 58th Street, Chicago 37

Take This First Easy Step

CHECK, CLIP AND MAIL COUPON NOW

AMERICAN SCHOOL, Dept. G146, Drexel at 58th, Chicago 37, Ill.

Without obligation, please send me FREE information on training course checked below.

- ☐ HIGH SCHOOL COURSES
- ☐ Accounting
- ☐ Air Conditioning
- ☐ Architecture & Building
- ☐ Automotive Engr.
- ☐ Aviation—Practical
- ☐ Aviation Drafting & Design
- ☐ Better Foremanship
- ☐ Bookkeeping
- ☐ Business Management
- ☐ Contracting
- ☐ Diesel Engineering
- ☐ Drafting & Design
- ☐ Electrical Engineering
- ☐ Electricity—Practical
- ☐ Electronics, Industrial
- ☐ Machine Shop Operations
- ☐ Mechanical Engineering
- ☐ Plastics Engineering
- ☐ Plumbing—Practical
- ☐ Private Secretary
- ☐ Radio Operating & Servicing
- ☐ Railway Training
- ☐ Refrigeration
- ☐ Sheet Metal Pattern Drafting
- ☐ Shop Management
- ☐ Tool Making

Name _____ Occupation _____

Address _____ Age _____

City & Zone _____ State _____

Learn this Profitable Profession

IN 90 DAYS AT HOME

Money-Making Career Open to Men and Women, 18 to 60

Hundreds of men and women between 18 and 60 make $10 to $20 in a single day giving scientific Swedish Massage and Hydro-Therapy treatments. There is big demand from doctors, hospitals, sanatoriums and clubs. Graduates earn large full time incomes from these or in private practice in their own offices. Others make good money from home treatments given in spare time. Learn this interesting, money-making profession in your own home, through our home study course. Same instructors as in our **nationally known** resident school. You can win independence and prepare for future security by qualifying for your Diploma. Course can be completed in 3 to 4 months. Many earn while they learn. Begin your training at once.

Anatomy Charts & Booklet FREE

Enroll now and we will include, at no extra cost, many needed supplies. Fit yourself to help meet growing demand for Scientific Swedish Massage. **Send the coupon at once for complete details, Anatomy Charts and 32-Page Illustrated Booklet, FREE, postpaid.**

THE COLLEGE OF SWEDISH MASSAGE
Dept. 170A, 41 E. Pearson, Chicago 11, Illinois

Please send me FREE and postpaid, Anatomy Charts, 32-page Booklet and complete details on **Home Training.**

Name.....Age.....

Address.....

City.....State.....

WHICH DO YOU WANT?

BETTER DIGESTION — **NORMAL ELIMINATION**
RESTFUL SLEEP — **STRONG HEALTHY TEETH**
CONTINUED GOOD EYESIGHT

VITA-MIX

Makes it easier to get essential vitamins and minerals from fruits and vegetables.

Only Machine With Stainless Steel Bowl and Bakelite Handle — ONLY **$29.95**

SELF-CLEANING—
ADD SOAP, WATER, TURN ON

In preparing food the ordinary way, you peel off and throw away those vitamin and mineral filled parts which are so essential to good health. With the Vita-Mix you keep ALL the natural health-giving food value. That's why you can literally drink your way to health with the Vita-Mix. Completely liquefies, whips, chops, emulsifies all fruits and vegetables into tangy, appetizing drinks. Leaves no pulp. No cooking, juicing or peeling of rinds necessary. Now has new unbreakable stainless steel bowl. Easy to sterilize.

Look What Vita Mix Does:

Makes health drinks in 1 to 4 minutes, makes soup without boiling in 3 minutes, makes cake batter ready for oven in 3 minutes.

2 Valuable Gifts Given With Order!

Vita Miracle Recipe Book
Shows you how to make 533 delicious dishes and drinks with your Vita Mix.

Wheel-O-Life
You need a Wheel-O-Life to tell you the vitamin, mineral and calory content of many foods.

Natural Foods Institute, Dept. PS-1, Olmsted Falls, Ohio
I enclose $29.95. Rush me your Vita-Mix plus 2 gifts.

NAME.....

ADDRESS.....

CITY.....STATE.....

LEARN

NEON

TUBE BENDING AND NEON SIGN FABRICATION

Prosperous neon sign and fluorescent lighting industries urgently need well-trained men to fill top-paying jobs. Learn luminous tube bending and installation at the school whose skilled graduates are sought by leading neon shops throughout the nation. Thorough 15-month GI-approved courses, best professional equipment. Write for illustrated Catalog "PS" today.

GENERAL INDUSTRIAL TRAINING INSTITUTE

130 SOUTH SEVENTH ST. — STEUBENVILLE, OHIO

New POWER MOWER

Build It Yourself And Save. Amazing new invention makes whirl-blade mower pull and steer itself as well as cut grass and weeds. Build it yourself. Send name and address on 1c postcard for FREE building instructions . . . NO OBLIGATION.

FREE Building Instructions

PULLS ITSELF, STEERS ITSELF

T & H Mfg. Co., Dept. MSC-1, 811 E. 31 St., Kansas City, Mo.

Spindle & Blade — Wheel — Swivel — Parts for Pulling & Steering
All Parts Available — Complete Kit or Separately.

WHAM-O SPORTSMAN*

$1.00 PPD. — 45-LB. PULL

HITS LIKE A .22 RIFLE—
KILLS RABBITS, SQUIRRELS.
Powerful, silent, accurate.
For hunting, target, routing pests.
Sportsman's choice said world over!

HUNTING SLINGSHOT
Heavy duty 7" ash stock.
40 steel balls, extra rubber straps.
GUARANTEED—at dealers, or send $1. to Wham-O Mfg. Co., Box2P, South Pasadena, Calif.
*Professional model of Nat'l Slingshot Assn
Extra steel balls 300 for $1. Rubbers 15c a pair.

LEARN AERONAUTICAL ENGINEERING

Aircraft and Engine Mechanics (A & E)

Train at the Flying Wing school—New classes starting soon. Write for illustrated catalog.

***Northrop** Aeronautical Institute*

APPROVED FOR VETERANS — DIVISION OF NORTHROP AIRCRAFT, INC.

1525 E. Broadway, Hawthorne, Los Angeles County, California

ReMarr

WILL CUT YOUR GAS BILL OR MONEY REFUNDED IN FULL

AUTOMATIC GAS INJECTOR

Use Remarr 30 days at *our risk*. Must save you substantial gas, give quicker starts, faster pick-ups, more power, better car performance, or return for *full refund*. SAVES MANY $$$ A YEAR. One Fleet owner says, "Have Remarr on 8 cars. Saves 1 gallon of gas in every 6, get increased power under full throttle." Order today. Give car make, model, year No. of cylinders.

$9.95 POST PAID

You Can Install It

WESCO Dept. R 31, 1665 Mission St. San Francisco 3, California

BRAND NEW SURPLUS UP TO 85% DISCOUNT

Portable LIGHT PLANT

PUSH BUTTON START

500-700 watts 110-120 v. — 60 cyc. A.C. Powered by a sturdy dependable, easy starting, air cooled 2 hp. gas engine. No wiring necessary, just plug in and operate. Plenty of current for oil burner, emergency lights, freezer, radio, incubator, etc. Complete protection against current failure. Ideal for hunting or camping. Complete with Voltmeter and built-in winding to charge 6 v. auto batteries. Wt. 83 lbs. Fully guaranteed. Be prepared if electric power fails. Reg. $275.00 value..... **$138.50**

(Item 24)

GIANT 2000-2500 WATT PLANT

Absolutely the best made because its heavy windings develop up to 5000 watt overload for motor starting. Skid-mounted—portable. Powered by 5 h. p. easy starting Briggs engine —complete with all accessories; engine easily disconnected for other uses. Big outlet box, voltmeter, no wiring necessary. Ample current for all purposes. Factory warranty and instructions included. Wt. 320 lbs. Reg. $585.00. Spec. at **$299.50.**

(Item 31)

GENERATOR ONLY and control box. Drive it with your engine or tractor. **$149.50.**

HOT WATER HEATER

(Item 26) Immersion type, heavy duty. 115v. A.C. 300w. Does not require watching. Thermostat shuts off at 165°. Keeps water hot for shaving, washing, dishes, etc. Also good for keeping water from freezing in big troughs or tanks. Made by Cities Service. Wt. 4 lbs. Worth $9.50. Our Spec. **$4.95.**

GAUGE TESTER

(Item 27) Precision made of solid bronze by Star Brass Co. Calibrated weights acting against hydraulic piston, provides quick, accurate testing of all pressure gauges up to 3000 lbs. per sq. in. Brand new in hardwood cases. Wt. 100 lbs. Reg. $435.00. Our spec. **$129.00.**

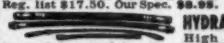
EXTENSION CORD

(Item 16) 40 ft. heavy duty, made of specially insulated No. 14 2-conductor wire. So tough that you can drive over it and yet amazingly flexible and easy to handle. Resists oil, grease or water. Extends electricity up to 400 ft. without voltage drop. Use indoors or out. Complete with heavy rubber plug and outlet. Wt. 2½ lbs. Usually $4.50—Special 40 ft. **$1.92** Comb: 2-40 ft. and 1-20 ft. (total 100 ft.) **$4.98**

PRESSURE SWITCH

(Item 30) Penn Electric Model 110 BPO2, best made. For pumps and air compressors. Heavy duty. Will handle up to 250 lbs. press. and up to 5 h.p. Autom. unloader valve, for easy starting. 110-220 v. A.C. or D.C. 2 pole. Wt. 4 lbs. Reg. list $17.50. Our Spec. **$9.95.**

HYDRAULIC HOSE



High pressure, heavy duty, complete with swivel fittings. Pipe thread connections. Ideal for farm equip., bulldozers, grease guns, air brakes, etc. Any length. Minimum order $2. INSIDE DIAMETER ¼" **40¢** per ft. ⅜" **80¢**, ½" **70¢**, ⅝" **90¢**.

PARTS WASHER

(Item 20) Stove gas or carbon tet. in 5 gal. safety can. Valve releases just the right amount into washing compartment. Parts are washed and drained on a "dunking" screen — no fishing for parts. Eliminates fire-danger, waste, spillage, evaporation. Wt. 14 lbs. Reg. $19.50—Special **$4.95.**

RUBBER HOSE

New genuine Neoprene Hose —outlasts ordinary rubber 3 to 1. Reinforced with super tough cotton cord plies. Flexible. Easy Flo brass couplings with standard pipe threads for quick connections, included. Pump water for irrigation, stock, tanks, home, barn, fire fighting, etc. Pump Gas or Fuel Oil. Save more than 60%.

(Inside Diam.)	1½"	1¼"	1½"
Length	25 ft.	40 ft.	50 ft.
Price	9.25	14.75	14.75

If specified we will send special hose for gas or oil at same prices.

HEATING & VENTILATING FAN

(Item 10) Easily installed in furnace pipes. Forces even heat to all rooms. Over range, removes kitchen smoke and odors. Powerful continuous duty motor, 110-120 V. A.C. Quiet, super efficient fan moves huge volume of air (400 to 600 c.f.m.) 8" Fan, wt. 4 lb. **$8.95**, 10" Fan, wt. 6 lb. **$8.95**, 12" Fan, wt. 8 lb. **$9.95.**

ANGLE DRILL

(Item 23) Fits into chuck of any electric or pneumatic drill or flex. shaft. Operates at any angle in a full 360° arc. Makes possible drilling, grinding, carving, routing, etc. in close cramped quarters. Makes impossible jobs easy. Made by Kett Tool Co. Complete with built-in chuck and adjusting key. Hardened alloy gears. Precision built for heavy duty. Lists at $29.95 — while they last **$9.95.**

CARRY-AIR

Stainless steel tank—capacity 500 cu. in. at 400 lbs. press. complete with inlet and shut-off valves, press. gauge, detachable air hose, tire chuck. Fill at any service station. Carry air for tire inflation, blowing out lines, spray painting, insecticides, etc. One emergency pays back cost. Wt. 7 lbs. Worth $20.00. Our price—**$8.95.** (Item 32)

FRAM OIL FILTER

(Item 12). Model F21. Big 73 cu. in. size. Ample capacity for all cars, trucks, tractors. Universal bracket, standard openings. Fram filters are top. Easy to install. Wt. 8 lbs. Usually $7.95—now **$3.75.**

CLIP BOARD

(Item 17) Heavy Masonite, with self-adjusting spring hinge to hold up to 100 sheets of 8½x11 paper. Push back cover for instant release. Flip cover shut and notes or drawings are protected. Perfect for pilots, engineers, students, artists, truck drivers. Wt. 2½ lbs. Usually $2.95. Spec. **$1.10, 2 for $2.00.**

All items *brand new*. Prices f.o.b. Chicago area. Money back guarantee. Send check or M. O.

The A & K EQUIPMENT & SUPPLY CO., Dept. 72, Burlington, Wis.

GRAVELY 5-HP TRACTOR

DOES 19 LAWN, GARDEN and FIELD JOBS— QUICK and EASY!

America's most practical small tractor for small farms, suburban homes.

* ALL GEAR DRIVE
* POWER REVERSE
* A QUALITY TRACTOR

FREE

"Power vs. Drudgery" tells how to put POWER to work! Write today!

GRAVELY MOTOR PLOW & CULTIVATOR CO.
BOX 184 DUNBAR, W. VA.

FIELD-TESTED FOR 28 YEARS

No Experience Needed To

PRINT YOUR OWN POST CARDS

The GEM STENCIL DUPLICATOR saves money . . . gets results quickly! Hundreds of uses for every type of business and organization. We ship the GEM complete with all supplies, Guide Board for accurate printing and 60-page Book of Ideas at the special low price of only **$8.50** (a $15 value).

FREE TRIAL OFFER *Our 21st Year*

Use the GEM **FREE** at our expense! SEND NO MONEY. Write and complete GEM outfit will be sent you postpaid. After ten days, send us only **$8.50** or return the GEM. You must be satisfied!

BOND EQUIPMENT CO. **Dept. 49**
6633 Enright • St. Louis 5, Mo.

MAGIC-SCREEN INCOME PLAN OFFERS BIG MONEY, AT HOME, SPARE OR FULL TIME

Reproduce any painting, design, trade-mark, picture, printing, in full color, on any surface! Proven new method enables you to cash in on *established* business where Profits up to $5.00 or more an hour are being made, *right now!* Examine complete Plan and equipment without risk!

Write today for free sample — Complete free details! **Send NOW!**

CALIF. ACADEMY OF SCREEN PROCESS DEPT. 11 5100 SO. VERMONT AVE., LOS ANGELES 37, CALIF.

Listen to this Record!

SPEAK FRENCH-SPANISH

RUSSIAN-GERMAN
ITALIAN-BRAZILIAN-JAPANESE

"Learn by Listening" to **CORTINA RECORDS**, at home, the **NATURAL** way—quickly, easily, cheaply.

Only 15 Minutes a Day!

THOUSANDS have found it the most fascinating, most effective way to learn languages for **Pleasure, Business, Travel, Culture. INVESTIGATE!**

Send For FREE BOOK!

Illustrated 32-page book, "The Cortinaphone Short-Cut" sent **FREE.** Tells just what you want to know. **Interesting. Get it!**

Write Today--NOW

CORTINA ACADEMY (Est. 1882)
Suite 121, 105 W. 40 St., N.Y. 18, N. Y.
Please send me—without obligation—your free book. I am interested in (check)
☐ French ☐ Spanish ☐ German ☐ Italian ☐ Brazilian ☐ Russian ☐ Japanese

Name.....
Address.....
City..... State.....
☐ Check here if you are a VETERAN

VETS! FRENCH OR SPANISH COURSE AVAILABLE UNDER G. I. BILL

Know all the answers, INSTANTLY, with an A-C-I WINDOMETER

FOR AIRPORTS, BOATS, HOMES, INDUSTRY, FARMS!

Know the important facts about outside weather instantly—and have them right at your fingertips, in one compact unit!

WIND VELOCITY—calibrated in leading University Lab. Wind Tunnel, for extreme accuracy.

WIND DIRECTION—built to aviation standards.

OUTSIDE TEMPERATURE—precision made, aircraft quality. All instruments and transmitters are highest quality precision aircraft type, with Gold-palladium and Silver contacts. Completely self-contained unit—use anywhere—easily installed.

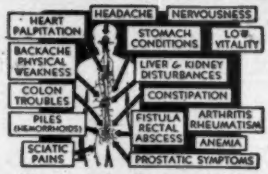
NEVER BEFORE such quality and precision at this amazing price!

AIRCRAFT COMPONENTS, INC.
1270 Woodland Avenue Benton Harbor, Mich.

Please send me one WINDOMETER complete as illustrated. My Check/Money Order for $89.50 enclosed.
Name _____
Street _____
City _____ State _____

Fistula May Often Result From Piles

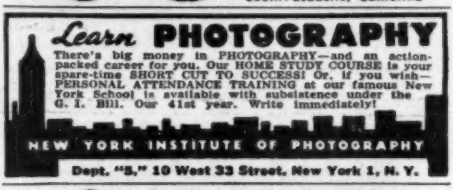
FREE BOOK—Gives Facts On Associated Ailments



A new, illustrated 40-page book on Fistula, Rectal Abscess, Piles and other rectal and colon disorders is now FREE to all sufferers. Write today—a card will do. Thornton & Minor Hospital, Suite 149, 911 E. Linwood, Kansas City 3, Mo.

STOP THE *COLD!* DUCK-IT post paid **$2**

Real comfort in cold climates for sportsmen, farmers, outdoor workers. Keeps face, neck and ears warm during long exposure. Worn over face or under chin. Heavy, durable yet soft and flexible. Fits all head sizes. 100% wool. Olive drab. Send $2.00 to The Woolwear Co., Box 2P South Pasadena, California



Learn **PHOTOGRAPHY**

There's big money in PHOTOGRAPHY—and an action-packed career for you. Our HOME STUDY COURSE is your spare-time SHORT CUT TO SUCCESS! Or, if you wish—PERSONAL ATTENDANCE TRAINING at our famous New York School is available with subsistence under the G. I. Bill. Our 41st year. Write immediately!

NEW YORK INSTITUTE OF PHOTOGRAPHY
Dept. "S," 10 West 33 Street, New York 1, N. Y.

How Many Men Will Wear *this* SAMPLE SUIT

and Make up to $15.00 in a Day?

Amazing plan! Wear sample suit and take orders for handsome made-to-measure tailoring from friends, neighbors. Just take a few orders—earn big cash profits and get your own suits Without 1¢ Extra Cost! Send no money; pay no money. Write for free outfit containing actual samples, styles, full instructions. Write now!

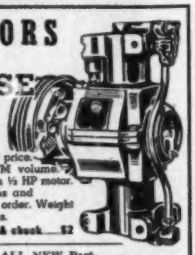
J.C. FIELD & SON, INC., Dept. N-1720
Harrison & Throop Sts., CHICAGO 7, ILL.

AIR COMPRESSORS

Lowest-Ever Closeout Price!

WESTINGHOUSE

Reg. $60.50 **19.50** per pair
Model T-1 Complete



Brand New Surplus Special at an amazing low price.—Westinghouse Double-piston type, 6.54 CFM volume. Mounts on truck or car engine—or operate with ½ HP motor. For farm, home, industry, painters. Instructions and spare parts kit included. Send check or money order. Weight 25 lbs. We carry a complete line of spare parts.

AIR HOSE—to fit, 25-ft. length with fittings & check $2

Terrific Gov't Surplus Value! Complete ALL NEW Portable Automatic Air Compressor Unit on wheels using above Compressor and Double Pressure Tank Assembly. Maintains any desired pressure up to 150 lbs. Measures 62"x29"x21". Everything included. Write for specifications. **58.80** Fgt. Ppd.

NATIONAL EQUIPMENT CO. 929 Fifth Avenue, Dept. SS Pittsburgh 19, Pa.

INVENTIONS WANTED

by these 138 Wealthy Companies

DON'T SELL YOUR PRECIOUS IDEAS CHEAP! Brand-new, impartial and unbiased book—**"Inventor's Sales Bulletin"**—now lists 138 reputable manufacturers who want to see your ideas—patented or unpatented—and are ready to put acceptable ones into production **and pay cash or royalty!** This book gives company names, addresses, persons to contact, exactly what they are looking for, etc. ALL FIELDS COVERED. How to avoid expensive mistakes others have made; how to choose a broker to sell your invention for small commission; how to sell patents through advertising at small cost; how much to ask for your invention; what to do about releases, working models. Also gives complete, illustrated plans for a new kind of sales portfolio that helps sell your invention faster, for more money; and a copyrighted disclosure form that makes it easy for you to contact manufacturers (requires no letter writing). Many illustrations, diagrams.

SEND NO MONEY: This new booklet was prepared at considerable cost by editors of Science and Mechanics Magazine TO PROTECT NEW INVENTORS. Examine it for a week—**without risking a penny.** Just send us your name and address. Book will be shipped at once. Pay postman only $2.00, plus 45c Delivery Charges. If not convinced book can be worth hundreds or even **thousands** of dollars to you—return it for a **Complete** Refund. Or send only $2.00 NOW and WE'LL pay postage. Same refund privilege after week's examination. INVENTIONS ARE WANTED NOW! SO WRITE TODAY: **Science and Mechanics Magazine, Dept. 752, 450 East Ohio Street, Chicago 11, Ill.**

THE AUTO OUTLET

A simplified electrical outlet for your car or truck, mounted on dashboard, easily installed. Plug in:

$1

Trouble Light — **Electric Shaver**
Defroster Fan — **Trailer Tail-Light**
Portable Spotlight — **Babies Bottle Warmer**

And other standard six volt accessories. All parts and complete instructions sent to you in kit form. Only **$1.00** postpaid from, **GENERAL SPECIALTY COMPANY, P.O. Box 1028, Saugus, Mass.**

Bar Bells

Buy Direct From Factory — **$8.95 up**

Write for free booklet and price list

INDEPENDENT IRON WORKS
2416 East 23rd Street, Dept. C
Los Angeles 58, Calif.

SPEED + MILEAGE MANUAL

BUILD 200 m.p.h. STOCKS, HOT RODS, RACERS
Famous Power book shows Souping Methods, Speed Tuning, Track Secrets, Gas Economy, "CALIFORNIA CUSTOMIZING," Restyling, Sports Conversions. Covers all makes! Working Plans for Superchargers, Dual Manifolds, Hi-Compression heads, racing cams, Water Injectors. "Get terrific pickup power—Double your gas mileage." Complete info, 320 illus! Satisfaction Guaranteed!

FREE — "CALIFORNIA HOT ROD HANDBOOK" plus SPEED EQUIPMENT CATALOG free with BIG MANUAL—All 3 books *postpaid or C.O.D.*..... **1.98**
(Racing Catalog without above books 25c)

ALMQUIST Automotive Engineering, Dept. 12P, Milford, Pa.

Glamour PHOTOGRAPHY

THE NEWEST SIMPLIFIED COURSE

Illustrated with Hundreds of Pictures!

Learn the techniques of discovering hidden beauty and recording it with your own camera. Soon you'll be taking PIN-UPS and GLAMOUR shots with that HOLLYWOOD APPEAL. All the fascinating phases are thoroughly covered: MAKE-UP, LIGHTING, the 24 BASIC POSES (illustrated), and a SPECIAL course in MODEL PSYCHOLOGY.

A COMPLETE HOME-STUDY COURSE

Send 25c for ILLUSTRATED BOOKLET to cover cost of mailing.

HARRISON STUDIOS — **Dept. S-1**
4100 Goodland Ave., N. Hollywood, Calif.

ENTER RADIO-TV thru *This Plan*—

As a young man with a career to build, you may *today* be interested primarily in training for Radio — and perhaps for TV. But — *who knows* . . . you may some day have both the desire and opportunity to climb further and become an Electrical Engineer! Here, then, is a world-renowned educational plan that permits you to use your Radio training as *a major stepping-stone* to an even greater career.

IN 12 MONTHS

become a

RADIO TECHNICIAN

Train here for radio shop operator or serviceman, mobile receivers and all types of transmitters, and for supervision of service personnel. You may then advance immediately, or at any future date, into courses described below.

IN 6 ADDITIONAL MONTHS

you become a

RADIO-TELEVISION TECHNICIAN

An additional 6-months course gives you intensive TV Technician's training — under the *personal guidance* so necessary in this expanding field.

***ALSO*... your Radio course is full credit toward the B.S. degree in**

ELECTRICAL ENGINEERING

The Radio course, while complete in itself, is *one-third* of the college program (major in Electronics—minor in Electrical Power). Further — you are guided scientifically toward specialization beyond basic engineering training.

Military, practical or prior academic training evaluated for advanced credit. Preparatory courses available. Over 1500 enrolled. Terms open April, July, October, January.

MILWAUKEE

SCHOOL of ENGINEERING

Technical Institute • College of Electrical Engineering

FREE — Write for helpful "Occupational Guidance Bulletin" and 1951 Catalog.

MILWAUKEE SCHOOL OF ENGINEERING
Dept. PS-151, 1020 N. Broadway, Milwaukee, Wis.
Without obligation, rush following: ☐ 1951 Catalog; "Occupational Guidance Bulletin" on ☐ Electrical Service ☐ Electro Technician ☐ Electrical Engineering (Power) ☐ Radio ☐ Television ☐ Electrical Engineering (Electronics) ☐ Heating ☐ Refrigeration ☐ Air Conditioning ☐ Welding.

Name_____Age_____
Address_____
City_____Zone_____State_____
☐ Check if World War II Veteran

WORTH $65 — MAKE IT FOR $12

WORTH $35 — MAKE IT FOR $8

NOW! YOU CAN EASILY MAKE "REAL" ANTIQUES!

right in your home, have fun; and save up to 85% of the cost!

Shows How To: Pick up "antiqued" lumber at bargain prices ● "Age" woods ● Make solid joints — **without glue!** ● Give furniture authentic antique look ● Apply "wear spots"! "old burns"; patina ● Burying wood, chemical aging, age-staining, etc. ● Waxing; polishing ● How to pick up authentic old hardware **or make your own** ● Applying stencils, designs ● Complete plans for 19th Century Pine Chest, Chippendale Chest, Easy to Make Tables, Corner Cupboards, Chairs, Grandfather-Clock Case . . . **LOTS MORE!**

If you can handle a saw, hammer and chisel . . . you can make authentic "antique" furniture only an expert can tell from real thing! Corner cupboards, clock cases, early American tables and chairs, panelled walls, etc. You can make them *better* and *more "real"* than most store-bought "antiques"—*and save up to 85% of cost!* Sell what you make at a good profit!

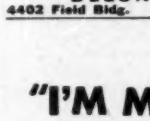
More "Real" Than Store Pieces

In his new book, "ANTIQUE REPRODUCTIONS FOR THE HOME CRAFTSMAN," Raymond F. Yates (authority on antiques, and a home craftsman himself) shows you how to turn old pieces of wood into the *nearest thing possible* to an original antique. Over 100 illustrations; detailed plans any beginner can follow.

FREE 10-DAY TRIAL

Send no money. Just mail postcard *with your name and address* for 10-day FREE trial. If not delighted, return book, pay nothing. Otherwise send only $2 then (plus postage) and $2 one month later. **McGraw-Hill Book Co., Dept. PS-1A, 327 West 41st St., New York 18, N.Y.**

CA$H IN YOUR SPARE TIME



BIG MONEY IN OWN BUSINESS

YOU CAN MAKE UP TO $40 A DAY sharpening and setting circular saws for factories, builders, lumber yards — with NEW BELSAW COMPLETE CIRCULAR SAW SHOP. LOW COST, Sharpens 4 to 5 saws per hour, no *experience needed*, complete instructions. Send today for FREE Catalog.

BELSAW MACHINERY CO
4402 Field Bldg. Kansas City 2, Mo.

C. KAMA

"I'M MAKING MORE THAN $1000 a Month

Haven't Touched Bottom Yet!"

Science's New Midget Miracle "PRESTO"

—reports Charles Kama, Texas, one of many who are "cleaning up" with orders for PRESTO, Science's New Midget Miracle Fire Extinguisher. So can YOU!

AMAZING new kind of fire extinguisher. Tiny "Presto" (about size of a flashlight!) does job of bulky extinguishers that cost 4 times as much, are 8 times as heavy. Ends fires fast as 2 seconds. Fits in palm of hand. Never corrodes. **Guaranteed for 20 years!**

Show it to owners of homes, cars, boats, farms, and to stores for re-sale—make good income. H. J. Kerr reports **$20 a day.** Wm. Wydallis, **$15.20 an hour.** Write for FREE Sales Kit. No obligation. MERLITE INDUSTRIES, Inc., Dept. 111, 201 East 16th St., New York 3, N. Y. In Canada: *Mopa Co., Ltd., 371 Bond St., Montreal 1, P. Q.* **(If you want a regular Presto to use as a demonstrator, send $2.50. Money back if you wish.)**

WAR SURPLUS BARGAINS

BLACK LIGHT KITS

FOR ULTRA-VIOLET FLUORESCENCE

NOW . . . you can build your own black light equipment at a new low cost with these easy-to-assemble components. Geologists, mineral prospectors and hobbyists can easily make laboratory black lights for mineral identification. Signs, posters, pictures, fabrics, house numbers . . . anything painted with fluorescent paint glows with eye-appealing fluorescence under black light. Kit contains: Ultra-Violet tube, brackets, ballast, starter, wire, plug and wiring diagram.

Special! 4 Watt Kit—(5¼" tube)..... *postpaid* $3.00
8 Watt Kit—(12" tube)..... ....$4.00

BRAND NEW POLE CLIMBERS

Buckingham pole climbers in their original package. (Without Straps) ONLY **$2.95** PER PAIR

LINEMAN'S TOOL & SAFETY BELT

Brand new web-type belts in their original box. SPECIAL **$3.95**

Enclose full amount with order

C and H *Sales Company*

BOX 356-S EAST PASADENA STATION ● PASADENA 8, CALIFORNIA

USE the POLICE METHOD to handle wise guys and bullys

The bigger they come, the harder they fall when the commanding knowledge of POLICE JIU JITSU IS YOURS! Brute strength, giant size and bulging muscles will not beat you when you master Police Jiu Jitsu. A complete course easy to read and learn in one illustrated volume . . . just pin $1 to this ad and we will send Police Jiu Jitsu to you postpaid. Satisfaction guaranteed or money refunded.

BOOKS PUBLISHING CO. 56 W. 24 St., New York 10

SEND FOR THIS FREE!

Make money. Know how to break and train horses. *Write today for this book FREE*, together with special offer of a course in Animal Breeding. If you are interested in Gaiting and Riding the saddle horse, check here ( ) *Do it today—now.*

BEERY SCHOOL OF HORSEMANSHIP
Dept. 581 Pleasant Hill, Ohio

RUPTURE!

An amazing Air-Cushion Invention allows body freedom at work or play. Light, neat, cool, sanitary. Durable, cheap. Day and night protection helps Nature support weakened muscles gently but surely. No risk. **Sent on Trial!** Write NOW for free Booklet and **Proof of Results.** All correspondence confidential.

Brooks Company, 163-H State St., Marshall, Mich.

FOR BIG MEN ONLY!

SEND FOR FREE CATALOG

SIZES **10 to 16** WIDTHS **AAA to EEE**

We SPECIALIZE in large sizes only—sizes 10 to 16; widths AAA to EEE. Loafers, Wing Tips, Moccasins, Dress Oxfords, High and Low Work Shoes, House Slippers, Rubbers, Overshoes, Sox. Extra quality at popular prices. Satisfaction guaranteed. Sold by mail only. Write for FREE Catalog.

KING-SIZE, Inc., 518 Brockton, Mass.

BE AN ARTIST

DRAW FOR MONEY

Here's the Amazing Way You Learn to Draw — Step by Step — at Home in Spare Time

TWO BIG ART OUTFITS GIVEN

Upon enrolling, we send you the **first** of TWO complete Artists' Outfits, including all the material you need to start this fascinating training. Later in the course you receive the second, advanced outfit. All at no extra cost!

Read What These Graduates Say:

TRAINING PAYS OFF—Fred B. Chott of Cicero, Illinois, says, "I have turned your teaching into profit very quickly." (1-49)

STAFF ARTIST AND CARTOONIST—G. W. Thomas, Los Angeles newspaper artist, says, "WSA is Number One School in U. S. A." (1-48)

FREE BOOK GIVES DETAILS

"Art for Pleasure & Profit" tells about our course of instruction and commercial opportunities for you—also about WSA students, reproductions of their art work, and results enjoyed by our graduates.

G. I. APPROVED FOR VETERANS **Est. 1914**

WASHINGTON SCHOOL OF ART

Enjoy a pleasant, profitable Art career, COMMERCIAL ART, DESIGNING, CARTOONING—all in one complete, modern home study course. Trained Artists are capable of earning $65, $80, $100 and more a week. Good Art positions await you in this great field. Become your own boss—work at home on your own time. Many students earn extra money while learning by designing posters, doing simple artwork, lettering, etc. WSA is now in its 37th year of training successful men and women. No previous Art experience necessary. We teach you from the beginning. Qualify for professional Art jobs in advertising, television, newspaper and magazine publishing, department stores, printing, art studios, etc. Get the exciting facts now in free, illustrated book. Low cost, easy terms.

MAIL COUPON FOR FREE BOOK

WASHINGTON SCHOOL OF ART
Studio 131A, Washington 5, D. C.

Send me without obligation your Free Book, "Art for Pleasure & Profit", with full information. No salesmen will call. (Please print).

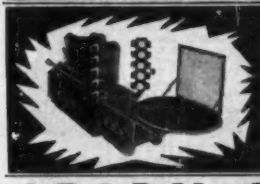
Name..... Age.....

Address.....

City.....Zone....State.....

I am entitled to training under G. I. Bill. ☐

BE A PHOTO-ENGRAVER



We furnish complete equipment and supplies. Learn at home or in our modern, friendly APPROVED school in MISSOURI. Get into this big demand, high profit, high wage field. You can start your own profitable, full time or part time PHOTO-ENGRAVING business right in your own home.

Be independent, be your own boss or pave the way to a high pay job with experience gained in your own shop.

TASOPÉ TRAINING and TASOPÉ EQUIPMENT has enjoyed world wide recognition since 1931. Write for descriptive literature today. No obligation.

THE AURORA SCHOOL OF PHOTO-ENGRAVING, DEPT. P-31 TASOPÉ BLDG., AURORA, MO.

LEARN MEAT CUTTING AT NATIONAL

Pay After Graduation

The steady dependable trade of Meat Cutting taught easily in 8 short weeks. You LEARN BY DOING under actual meat market conditions in big modern school at Toledo.

For beginners or men with experience. Get a profitable store of your own. Remember, PEOPLE MUST EAT! Big pay jobs. Free employment help. Thousands of successful graduates.

Buying, cutting, percentage, pricing, advertising, selling, etc. A complete retail meat education. National School established over 25 years. Get National training NOW. Pay your tuition in easy weekly payments after you graduate. G. I. approved. Send coupon for FREE 52 page school catalog—TODAY..

National School of Meat Cutting, Inc.
Dept. S1-N, Toledo 4, Ohio

Send me your FREE school catalog on National Training at Toledo in Meat Cutting, Meat Merchandising and Self Service Meats. No obligation. No salesmen will call.

Name.....

Address.....

City.....State.....

( ) Check here if Veteran of World War II

"I'M EARNING $300 A MONTH!"

.... says Leonidas Burgoyne of Chicago, Illinois, "Expert individual instruction in the fully equipped shops of Greer Shop Training gave me the right start to get my good paying job."

GREER SHOP TRAINING .... established 1902, is one of America's largest trade schools. Over 48,000 successful graduates. You learn by tearing down, repairing and rebuilding. Day and evening classes. Mail this coupon today!

LEARN A TRADE NOW!

GREER SHOP TRAINING, Desk 311, 460 S. State St., Chicago, Ill.

Gentlemen: Please send me information about trade I have checked below. (Specify if you are VET ☐ or NON-VET ☐).

IN OUR CHICAGO SHOPS
- ☐ AUTO MECHANICS
- ☐ DIESEL
- ☐ REFRIGERATION
- ☐ BODY, FENDER REPAIR
- ☐ WELDING—ARC, GAS
- ☐ MACHINIST
- ☐ PIANO TUNING

Above courses approved for Vets and Civilians.

ALSO THE FOLLOWING HOME STUDY COURSES
- ☐ REFRIGERATION
- ☐ DIESEL
- ☐ PLASTICS

Name _____ Age _____

Address _____

City _____ State _____

GREER SHOP TRAINING

Learn ACCOUNTING BOOKKEEPING

This nationally renowned school has demand for graduates in good salary positions thru Nationwide recognition and placement service. Write Department PSX today for Big 32 page Success Book to be sent to you **FREE**

Hills BUSINESS UNIVERSITY AND EXTENSION SCHOOL
619 W. MAIN ST. OKLAHOMA CITY 2, OKLAHOMA

Can You Equal This Home for $2915

Shipped Direct from Our Mill

Save 30% to 40% on Your New Home.. Act Now!

Don't pay several hundred dollars more than necessary when you build a home! Buy direct from our mill at our low factory price. We ship you the lumber cut-to-fit, ready to erect. Paint, glass, hardware, nails, etc., all included in the price—no extra charges. Plans furnished—also complete building instructions. No wonder our customers write us that we saved them 30% to 40%. Easy terms—monthly payments.

BIG BOOK of House Plans in Colors 25¢

Handsome Big CATALOGUE

Pictures wonderful homes in colors at money-saving prices. Designs to suit everyone. Send 25c for catalogue today.

LEWIS MANUFACTURING CO.
1311 Lafayette Ave., Bay City, Mich.

PARTS FOR MILITARY TRUCKS

At a Savings. New FREE Catalog
For Jeep, Dodge, Chevrolet, G.M.C., Studebaker

Brand New—Not War Surplus—Complete
JEEP TOPS and SIDE CURTAINS
Fits all Military Jeeps. Also adaptable to some Civilian Jeeps. Waterproof O.D. $59.50

TRAILER AXLES

Heavy duty trailer axle suitable for many types of trailer construction. Also excellent for building of heavy farm trailers and wagons. It is a 12,000 lb. capacity square type straight trailer axle complete with Timken roller bearings, hubs and 6 hole 750 x 20 Budd Wheels. Without brakes. Axle is 2 inches square and 69 inches between wheel mounting flanges. Std. width.

With Single Wheels $89.50 — With Dual Wheels $69.50

Hundreds of Other Truck & Jeep Parts and Supplies

All prices quoted good 30 days FOB, Kansas City
25% deposit required on all orders.

JEEP MOTORS **UNITED AUTO PARTS CO. INC**
1901 TROOST · GR.1800 · KANSAS CITY, MO.

REAL ESTATE BE A BROKER

PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! No obligation. Graduates report making substantial incomes. Start and run your own business quickly. Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. STUDY AT HOME or in our classrooms in big cities. Diploma awarded. G.I. approved. Nationally known.

FREE BOOK TELLS HOW

WEAVER SCHOOL OF REAL ESTATE (Est. 1936)
18 E. Pershing Road, Dept. PS, Kansas City, Mo.

ENORMOUS PROFITS CASTING AT HOME

Write today for NEW FREE CATALOG

Learn to cast thousands of perfect figurines, plaques, book ends, ash trays, etc. Start NOW—NO EXPERIENCE, LITTLE CAPITAL needed. Earn GREAT PROFITS with X.L. RUBBER MOLDS. X.L. Rubber, Pts. $2.00; Qts. $3.50; Models and enough rubber for 3 molds . . . $1.30 postpaid.

FREE FACTS SENT

PLASTIC ARTS STUDIO 3403 S. Madison St. Dept. 3 MUNCIE, IND.

EASY TO LEARN CODE

Learn or increase speed with an Instructograph—the Radio-Telegraph Code Teacher that takes the place of an operator-instructor and enables anyone to master code without further assistance. Available tapes from beginners alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready—no QRM. Thousands have "acquired the code" with the Instructograph System. Write today for convenient rental and purchase plans.

INSTRUCTOGRAPH COMPANY
4701-P Sheridan Road, Chicago 40, Illinois

WAR SURPLUS BARGAINS

$500,000.00 INVENTORY for QUICK LIQUIDATION

Surplus items—hundreds of them for home, shop, factory, farm and outdoor use. New items, used items, reconditioned items—all at tremendous savings—all priced for quick sale.

PAGE AFTER PAGE OF VALUES

This big catalog shows page after page of amazing money saving values. Write for your copy today. Send 10c to cover postage, mailing, etc. Write today!

SEND TODAY FOR YOUR COPY **10c**

STARK'S 309 So. State St. Dept. PS-1 CHICAGO 5, ILL.

MAIL THIS OPPORTUNITY COUPON TODAY!!

GET FASCINATING NEW

FREE PROFIT PLAN

Tired of monotonous, low-pay jobs . . . tired of working for the other fellow? Cash in on rich profits in this huge NEW field. Have your own successful lifetime business . . . earn REAL money and say goodby forever to time clerks and bosses! Become a part of this tremendous new expanding industry — yet work right from your own home!

NELS IRWIN says — "Benefit by my experience. My plan has helped thousands."

Learn how to get BIG PROFITS on new MIRACLE finish that makes old objects beautiful, salable — new things worth much more.

FLOK KRAFT

USE COUPON FOR FREE SAMPLE

COAST INDUSTRIES Dept. 11
1004 S. Los Angeles St., Los Angeles 15, Calif.
Gentlemen: Please rush me all the details - FREE.

NAME _____
STREET _____
CITY _____ STATE _____

INVESTIGATE TODAY!

FABRICS, METALS, PLASTER, ANY SURFACE

LAMPS

PHONOGRAPH TURNTABLES

AUTOTRUNK INTERIORS

TOYS

FREE BOOKLET & SAMPLE

AUTO DASHBOARD

COVERS: WOOD, JEWELRY BOXES

RADIOS

SHOES

YOUR BIG OPPORTUNITY - GET INTO A NEW AND PROFITABLE BUSINESS.

NOW! LEARN IN A FEW DAYS THROUGH PROVED, TESTED METHODS

to start earning more money than you've dreamed of with this amazing MIRACLE finish, which gives a velvety, luxurious surface to radios, lamps, toys, signs, store displays, figurines auto dashboards and hundreds of other items. FREE PROFIT PLAN offers everything you need to start at once!

ENORMOUS DEMAND FOR NEW MIRACLE FINISH

We show you every step on the road to success, filling huge year-round demands plus tremendous XMAS holiday business . . . easy to understand instructions tell you how to earn up to $5 an hour full or spare time. A few cents worth of materials brings you dollars!

GRASP THIS OPPORTUNITY TODAY

It's too good to miss . . . Fill out coupon above, mail today. Get FREE sample, FREE plan, big IDEA booklet. No salesman will call! Do it NOW . . . be first in your community to cash in on this huge new market!

"Pleased with your course and I'm being swamped with work to do." - W.F., Pa.

"Got $52.50 for those 7 trunk interiors for about 4 hours work. $7.50 per trunk." J.O., Missouri

READ WHAT OTHERS SAY ABOUT OUR PLAN

COAST INDUSTRIES Dept. 11
1004 S. Los Angeles St.
Los Angeles 15, Calif.

WANT TO

SAVE GAS?

BE PREPARED IF RATIONING RETURNS

4 MILLION NOW IN USE

TRY IT FREE IN YOUR CAR

TEST FOR
✓MORE MILEAGE ✓FASTER PICK-UP
✓EASIER STARTING ✓BETTER IDLING

You can install it easily in a few minutes

THE AMAZING GANE AIR FLOW NEEDLE

Gane replaces the idling adjustment screw in gasoline carburators.

Holes for Air Flow

MANY GANE NEEDLE USERS REPORT up to 25% more mileage, faster pick-up, easier starting and smoother idling. TRY A GANE NEEDLE IN YOUR CAR for ten days at our expense, then compare your mileage and performance. If fully satisfied, send only $1.50 per needle (8 cylinder cars take 2). If not satisfied, just return it—FAIR ENOUGH? Since authorities differ on its merits and some users report no improvement, TRY BEFORE YOU BUY!

Write today. Enclose no money. Pay postman nothing. Send us your name, address, make and year of car—and the make of carburetor if convenient.

Economy in Driving

BOOK SENT FREE! This auto economy manual is sent *absolutely free to all who try Gane Needles*. It tells how to save gas, tires, brakes and tells how you can gain more power, speed and better performance from your car. This combination manual-catalog also introduces many new and ingenious economy products.

NATIONAL AUTOMOTIVE RESEARCH CORP., Dept. N-1
250 West Washington Blvd. Venice, Calif.

WANT A GOVERNMENT JOB?

START AS HIGH AS $3,450 YEAR

Many 1951 Examinations Expected. Prepare NOW! Veterans Get Special Preference! 40 Page Civil Service Book FREE Mail Coupon Today SURE ★

Franklin Institute
Dept. M-81,
Rochester 4, N. Y.
(Not Government Controlled)

Gentlemen: Rush to me, FREE of charge, list of U. S. government big pay jobs. Send FREE 40-page book describing salaries, vacations, hours, work, etc. Tell me how to qualify for one of these jobs.

Name.....
Street.....
City.....Vet?.....

① I SHOW YOU HOW TO

MAKE MONEY AT ONCE

② START YOUR OWN BUSINESS

IN 2 WEEKS— AT HOME IN SPARE TIME

METALIZE BABY SHOES

IF YOU ACT NOW, I will show you how to start earning extra money immediately—in spare or full time. AND I SHOW YOU HOW to start your own profitable business. With my complete course and easy-to-understand illustrated instructions containing trade secrets of ALL metalizing processes. PLUS 2 beautifully processed sample metalized baby shoes AND all my tested and proved methods of operating a successful metalizing business. I show you how to start YOUR OWN profitable, fascinating business right in YOUR OWN HOME. Up to $5 per hour possible. Absolutely no experience needed. For PROOF send coupon today for FREE details of my MONEY MAKING PLAN for you and be convinced.

FREE! MONEY MAKING PLAN

Full Details Without Obligation

MAIL COUPON TODAY!

KIKTAVI CO.
Dept. S-511, 3111 W. Manchester, Los Angeles 44
Send me FREE details of your MONEY MAKING PLAN, without obligation.

NAME_____

STREET_____

CITY_____ ZONE____ STATE_____

MAKE EXTRA MONEY

PLASTICS

LEARN AT HOME

There are RICH OPPORTUNITIES for MEN and WOMEN with "know-how" in Plastics. Interstate's amazing new Plastics course tells and shows how to make hundreds of fast selling items out of Plastics. Gives complete training in fabrication, casting, lamination, molding, etc., in simple, easy, step-by-step language and pictures.

START A PLASTICS BUSINESS OF YOUR OWN. No other industry holds such promise for the future. You can make big money manufacturing novelties, toys, signs, etc., in your own home in spare or full time. Don't wait! Learn NOW how Interstate's Plastics Training qualifies you for success in the plastics field.

Write for FREE Information Today!

INTERSTATE TRAINING SERVICE
School of Plastics
PORTLAND 13, OREGON
(Dept. 2A)

AERONAUTICAL ENGINEERING

PS-1

Design Aircraft & Components—Study with Jets & Rockets—Great Future—Advanced Aeronautical Subjects—World-Wide Enrollment—Fully Accredited—Established 1929—Approved for Vets—CAL-AERO grads in heavy demand.
WRITE TODAY for Special Information.

NAME_____ AGE____

ADDRESS_____

CITY_____ ZONE____ STATE_____

CAL-AERO TECHNICAL INSTITUTE
GRAND CENTRAL AIR TERMINAL • GLENDALE 1, CALIFORNIA

NEW! SENSATIONAL DEVICE ENABLES ANYONE TO TEST OWN EYES

RIGHT AT HOME

SAVE up to $[illegible] On Glasses

Big News to the Millions of Spectacle Wearers and Prospects. Means Freedom from Outrageous Prices. Perfect Satisfaction Guaranteed! It's Big!

MAKE BIG MONEY QUICK
FREE SAMPLE KIT!

Send for Free Sample at once. Show it to friends and others. Let them use it Free and watch their amazement over this new system of Self Testing. Here is a great new opportunity in a tremendous new field of unlimited possibilities. Spare or full time. No experience or capital needed. Act quick!

Clark Optical Co., Dept. A-235, 1148 W. Chicago Ave., Chicago 22, Ill.

Play GUITAR in 10 DAYS

OR GET YOUR MONEY BACK!
Let Ed Sale teach you to play with his famous diagram photo system. Book contains 53 photos, 43 diagrams showing exactly how to place your fingers. Gives you 110 popular songs, words and music—along with complete, easy to learn instructions. Imagine your joy when you find after only two weeks you are playing beautiful music! Amaze your friends! Be the life of the party! SEND NO MONEY. Pay Postman $1.95 Plus Postage.

ED SALE Dept. PS-1 POINT PLEASANT, NEW JERSEY

Amazing Chemical Mitt

AUTO WASHER

Auto washed in ½ time. PRESTO! Dust, grease, dirt, and grime disappear like magic. Leaves finish clear, lustrous. Auto gleams like a mirror.

SAMPLES TO INTRODUCE
Sample offer sent immediately to all who send name at once. Hurry, postal will do.
SEND NO MONEY—Just your name.
KRISTEE CO., Dept. 702, Akron 8, Ohio

You CAN DO FINE LEATHERCRAFT
COPPER TOOLING • TEXTILE PAINTING
Real enjoyment and pleasure of creating valuable things for your own use or to sell. It's so easy, too! Send for your free Kit Kraft Catalog today.

KIT KRAFT DEPT. PS • 7311 MELROSE AVE. HOLLYWOOD 46, CALIF.

RUPTURE

RELIEF...OR YOUR MONEY BACK
Write now for free booklet and pictures of rupture care. You can be helped...work steady, with low cost, easy to wear Web Truss, thousands satisfied.

WEB TRUSS CO. Dept. S-1, Hagerstown, Maryland

•• A SHOE BUSINESS IN YOUR HAND! ••

EARN $60 WEEKLY WITH ONLY 3 SHOE ORDERS A DAY!

Make more money with famous 30 year old company. Show complete line quality shoes for men, women, children. Commissions to $3.25 per pair. PLUS Cash Bonus to 75c per pair. PLUS Paid Vacation! Smash hit styles with magic comfort heel-to-toe cushion are selling dynamite. No experience or investment needed. Actual shoe samples supplied without cost. Write TODAY for full information and FREE 60 page 1951 Catalog.

TANNERS SHOE CO., 740, Boston 10, Mass.

MARVEL
MYSTERY OIL

JAN. 1, 1951

A New Year's Resolution for your car

A trouble-free year is ahead for you if you use Marvel Mystery Oil in your automobile crank case.

Prevents motor deterioration, sticky valves, gum formation and ring sticking ...gives you added power and mileage through smoother, better lubrication.

Marvel Mystery Oil has no equal. Ask your dealer and obtain expert advice about it or write for free information. Dept. No. 101.

EMEROL MANUFACTURING CO., INC.
242 West 69th St., New York 23, N.Y.

Model Railroading is more fun

than you imagine, and less expensive than you think!

● 250,000 people can't be wrong. They are having real fun with the world's fastest growing hobby. Get this picture-packed book that tells how simple it is to start . . . and how surprisingly little money is needed.

Fully illustrated, this book tells how constructive this hobby is. Enjoyed by anyone from 7 to 70. Send 10¢ today for your copy of "Model Railroading for You," written by a well-known authority.

MODEL RAILROADER MAGAZINE
Dept. 1649—Milwaukee 3, Wis.

IS YOUR FUTURE WORTH 1¢?
that's all it costs to find out about correspondent courses in

FREIGHT TRAFFIC MANAGEMENT

$60 a week is the average starting salary . . . others earn up to $20,000 a year in this uncrowded field.

Courses: General, Advanced, Air Freight, Export and Import, Motor Carrier. Practical training given as well as theory — by men daily engaged in Traffic Management. Get the facts today.

Send a penny card for **FREE BOOKLET**
Co-educational **Veterans Inquiries Invited**

RESIDENT CLASSES: Hartford, Bridgeport, Trenton, Rochester, New Haven, Buffalo, Erie, Baltimore.

TRAFFIC MANAGERS INSTITUTE
154 Nassau Street, New York
Branches: 294 Washington St., Boston, Mass. | 10 South 18th St., Phila., Pa.

GO PLACES

LEARN ANOTHER
LANGUAGE
EASILY — QUICKLY
by **LINGUAPHONE**
IN 20 MINUTES A DAY
World's-Standard CONVERSATIONAL METHOD

FRENCH SPANISH GERMAN —any of 29 Different Languages

Are you letting interesting job, travel opportunities and a whole new world of social advantages pass you by because you speak only one tongue? Speak French, Spanish, Russian—any of 29 languages—quickly, easily by the one and only LINGUAPHONE CONVERSATIONAL METHOD. You listen—you learn—you understand—you SPEAK. World-wide educational endorsement; over a million delighted home-study students. FREE BOOK gives fascinating facts. Write TODAY!

LINGUAPHONE INSTITUTE
147-01 Rockefeller Plaza New York 20, N. Y.

High School at Home

Many Finish in 2 Years

No classes. No time wasted going to and from school. Progress as fast as your time and abilities permit. Standard H. S. texts supplied. Thousands enroll each year in this 52-year-old school. Send for FREE descriptive booklet.

AMERICAN SCHOOL, Dept. H-146
Drexel at 58th St., Chicago 37, Ill.
Without obligation, please send FREE descriptive booklet.

Name.....

Address.....

Can a Man MY Age Become a

HOTEL EXECUTIVE

Even Though He Has No Previous Hotel Experience?

Would you like to step into a well-paid position as Hotel, Club, Restaurant or Inn Manager, Purchasing Agent, Social Director, or Assistant Manager? Would you like to look forward happily to the future? The success of Lewis graduates from 18 to 50 PROVES you can —though you have no experience in hotel work.

Louis M. Reny, Veteran, Without Hotel Experience Wins Assistant Hotel Manager's Position

"I took the Lewis Course after leaving the Air Force. Even before graduation I had accepted a position through your Placement Department. Now Assistant Manager of a fine Washington, D. C. hotel. All this could not have happened without the help of the Lewis Hotel Training School. I am looking to the future with confidence."—Louis M. Reny.

Step Into a Well-Paid Hotel Position
FREE Book Gives Fascinating Facts

Our FREE Book, "Your Big Opportunity," explains how you can qualify for a well-paid position at home, in leisure time; tells how you are registered FREE of extra cost in the Lewis National Placement Service. Most important, it shows how you can be a Lewis Certified Employee—certified to "make good" when placed in a position. Mail the coupon NOW!

Course Approved for Veterans' Training

Lewis Hotel Training School
Room TA-2724, Washington 7, D. C.

35th SUCCESSFUL YEAR

Send me the Free Book, "Your Big Opportunity," without obligation. I wish to know how to qualify for a well-paid position at home in my leisure time.

Name.....

Address.....

City.....Zone.....State.....

☐ Check here if eligible under G.I. Bill of Rights.

TRAIN IN OUR SHOPS...

in AUTOMOTIVE MECHANICS BODY and FENDER REBUILDING

If interested write or wire

ATLANTA MOTIVE TRADES INSTITUTE

Dept. PS 254 IVY St., N.E. Atlanta, Georgia

Member of the Southern Association of Private Trade Schools

Veterans ask about G I Training

MAKE EXTRA MONEY with Larson Leathercraft

Easy-To-Assemble Kits
No Experience Needed

Get started now. LARSON Beginners' Kits of ready-cut projects require no tools or experience. Free instructions included. Make belts, gloves, moccasins, billfolds, woolskin animals and mittens, other attractive leather items. Also America's most complete stock for advanced hobbyists and professional craftsmen. SEND 10c TODAY for newest 24-page catalog.

J. C. LARSON CO., 820 So. Tripp Ave.
Dept. 417 CHICAGO 24, ILLINOIS

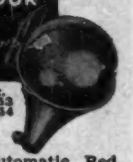
J. C. LARSON CO., Dept. 417,
820 SO. TRIPP AVE., CHICAGO 24, ILL.
I am enclosing 10c, for which please send latest 24-page illustrated catalog for Leathercraft Kits, Supplies, Leather and Tools.

NAME.....

ADDRESS.....

CITY.....STATE.....

BE A HIGH-PAID MAN IN YOUR COMMUNITY WITH THIS LONG NEEDED INVENTION



Earn up to $10,000 or more per year! U.S. Pat. D 133853
Nothing to invest! Be your own boss! D 133854

A worldwide product needed by every home, business and farm... priced to sell quickly! Automatic Red Comet goes into action as soon as fire starts... smothers fire without human aid. It's a sales 'natural'!

FREE SALES KIT

Demonstrator units, sales literature, etc., furnished you FREE. Handsome leather-type kit. Tried and proved. It will make you an independent businessman. ACT NOW! Someone in your community will be appointed soon. Write for details, today!

RED COMET, INC.
846 R. C. Bldg., Littleton, Colo.

ANY BOOK IN PRINT

Delivered at your door. We pay postage. Standard authors, new books, popular editions, fiction, reference, medical, mechanical, children's books, etc. Guaranteed savings. Send card for Clarkson's 1951 Catalog.

FREE Write for our great illustrated book catalog. A short course in literature. Buying guide of 300,000 book lovers. Free if you write Now—Today!

CLARKSON PUBLISHING CO., Dept. PS-511 1257 S. Wabash Ave., Chicago

TRY WATER-INJECTION 30 DAYS AT OUR RISK!

Add zip to your car with "Vapo-Jet." Automatically combines water, oil vapors, with fuel, to help give smoother performance, more power, faster get-away, better pick-up, fuel economy.

Limited Supply Rush order today! Give car make, model, no. of cyl. Remittance with order saves postage!

ONLY $9.95 Post Paid

DANTEL MFG. CO., 13610-E., S. Central Ave., Los Angeles 59, Calif.

FREE SAMPLES!
GLOW IN THE DARK!

BIG PROFITS showing amazing Luminous Specialties—house numbers, pictures, plastic novelties, religious and nursery objects, ash trays, keyholders, etc. Large manufacturer. Enormous demand. Sell on sight. WRITE AT ONCE for FREE samples.

Madison Mills, 303 4th Ave., Dept. T-5, New York 10, N.Y.

NOW AT LAST! A PLUG THAT INSURES SAFETY!

New type Non-Standard Plug will not fit any receptacles. Makes dangerous household appliances harmless. Ideal for home workshops where children are around. This plug can only fit adapter section. When not using your electric appliances or equipment, put adapter section away from children. Stop worrying about electric fan, washing machine or television sets. For home shops from electric motors to dangerous jig saws. Don't delay, send in for yours now. Regular two pc. unit $1.00 or three plugs and one adapter $2.00. We pay postage. No C.O.D.

CAMELLE CO., 5012 N. 11th Street, Philadelphia 41, Pa.

RUPTURED?

Get Relief This Proven Way

Why try to worry along with trusses that gouge your flesh—press heavily on hips and spine—enlarge opening—fail to hold rupture? You need the Cluthe. No leg-straps or cutting belts. Automatic adjustable pad holds at real opening—follows every body movement with instant increased support in case of strain. Cannot slip whether at work or play. Light. Waterproof. Can be worn in bath. Send for amazing FREE book, "Advice To Ruptured," and details of liberal truthful 60-day trial offer. Also endorsements from grateful users in your neighborhood. Write:

CLUTHE SONS, Dept. 14, Bloomfield, New Jersey

Sale! WAR SURPLUS BARGAINS Sale!

HEATING SPECIALS! HEAT CONTROL

Made by Minneapolis-Honeywell—a name known for the best in controls. 1000 watts—115 to 220 volts. Element length 10 ft. Range 70° to 212° Fahrenheit. Control fans, motors, furnaces. This control makes an ideal automatic combination when hooked up to the heat booster below! List price $16.00. Your price **$8.95**

HEAT BOOSTERS

Fits any 8", 9", 10" furnace pipe. 1500 RPM motor with 6' cord, mounting frame, 7" blade. Motor 110 volt 60 cycle 1550 RPM. Easy to install. Silent operation. Warm those rooms with long runs. **Stock #863. Regular $11.95. Your price $6.95**

10" ball bearing fan Mfg. by Redmond. Can be run vertically or horizontally. 110 volt AC 60 cycle motor with plug and cord. New in original box. Use it for the kitchen as an exhaust fan, heat booster, etc. High pitch blade. 1/25 HP 1550 RPM. only.....**$11.95**

AIR COMPRESSORS

Gas or electric. Awarded from government.

½ HP	12 gal. tank		$89.50
1 HP	50 gal. tank		$229.00
1½ HP	50 gal. tank		$237.00
2 HP	50 gal. tank		$264.00
3 HP	60 gal. tank		$325.00
5 HP	60 gal. tank		$382.00
7½ HP	80 gal. tank		$625.00
10 HP	80 gal. tank		$642.00

CLUTCH

For Motor-scooters, Motorbikes, Lawn Mowers, etc. Mercury centrifugal clutch for use with any small gas engine. 3" "A" belt pulley, ⅝" bore. Brand new fully. **Stock #490**.....**$9.95**
⅝" bore. NEW.....**$9.95**
1" bore.....**$10.95**

ROCKFORD CLUTCH Manual, bronze throw yoke 1¼" bore, 1" female spline; 5" face, 5½" OD. Takes to 25 HP. PRICE ONLY **$13.50**

BALL BEARING ARBORS

Grinding and saw arbor, has ⅛" double end shaft, 11½" long with 2" center pulley. New Departure double roll ball bearings. Right and left hand thread. Self aligning Dodge pillow block. 10,000 RPM. Bearings alone list at $10. Complete arbor new. **Stock #308**.....only **$8.95**

GENERATORS

200 Watt, RPM 3400, 110 and 220 volt, ¼" shaft **$49.00**; 1000 Watt, RPM 1800, 115 volt AC 60 cycle **$199.00**; 2500 Watt RPM 1800, 115 volt AC **$165.00**; 3000 Watt, RPM 2800, 110 volt DC Delco ball bearing, 1" shaft. List $343.00 to you at only.....**$99.00**

It's unbelievable. 50 to 75% savings. Use for: Farms, cottages, stores, garages, floodlighting, drilling rigs, refineries, house trailers, fire departments, sound trucks, yachts, tugs, construction, airports, police radios, etc. 5 KW 120 Volts 60 cycle AC. ENGINE: Hercules 4 cycle, Gasoline. GENERATOR: Mfr'd by Hobart Bros. Unit includes remote control cable, 150' 3-wire, #6 and 150' 3-wire, #16, exhaust pipe, power cable plug. KVA at 80% power factor, radio and television filtered. Unit is completely automatic. List price today $1900.00. Now priced for you at **$478.00**. 2500 Watt, AC 115 volt 60 cycle, single phase. ENGINE Briggs & Stratton, air cooled, 6½ HP GENERATOR: Westinghouse or Leland, belt drive. Complete with $30.00 worth of spare tools, instructions and fully GUARANTEED. Was formerly priced at approximately $700.00. Now priced for you NEW only.....**$298.00**
Reconditioned.....**$248.00**
Generator NEW.....only **$165.00**
750 to 1000 watt, all single phase, 110 volt AC NEW.....**$129.50**

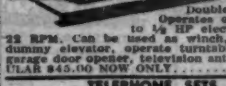
VOLTS	WATTS	PRICE
110-220	300	$ 49.50
110	3000	$895.00
	Rebuilt models at	$495.00
110-220	10,000	$1199.00
110-220	25,000	$2100.00
110-220	35,000	$2750.00
110-220	60,000	$5500.00

All units 10,000 watts and over, 110-220 single or 3 phase. LIGHT PLANT BUYERS. In emergency telephone collect—unit shipped same day!

AUTOMATIC CONTROL VENTILATOR

For **BARNS, ATTICS** or **BASEMENTS**. Increases cows milk production.
20" fan driven by ¼ HP motor. Switches and thermostat similar to heat control at upper left included **$89.95**
Available in other sizes.

GEAR REDUCER



Double reduction. Operates on any 1/6 to ½ HP electric motor. 22 RPM. Can be used as winch, barbecue, dummy elevator, operate turntable, electric garage door opener, television antenna. REGULAR $45.00 NOW ONLY.....**$22.00**

TELEPHONE SETS

Not a toy—but the real McCoy! Magneto-bell ringing set; operates 2 stations or 101 2 telephones with 200 ft. wire.....**$19.95**

AUTOMATIC OIL TANK WATCHMAN

No risk of oil tank going empty. Pilot light turns on when fuel level gets down to danger or minimum point.....**$11.95**

SPECIAL! HOT ROD SUPERCHARGER

Here's a hot rod supercharger at a price you can't afford to miss. SEE HOW THIS TYPE SUPERCHARGER IS USED in PICTURE and ARTICLE on Page 67 AUG. Issue of POPULAR MECHANICS. Mfg. by Borg & Warner. SPECIFICATIONS: 7½" wide, 8" deep, 9" high. Weight 17 lbs. Compact and sturdy, 4 base mounting holes. ¾" outlet, ⅝" shaft, includes female Lovejoy coupling. Priced today at $85. **OUR SPECIAL SALE PRICE ONLY**.....**$16.95**

HEAVY DUTY ELECTRIC CABLE

Electric rubber cable, 16 cond., No. 18, solid, 100 feet or more, per foot....$ .12
Electric rubber cable, 10 cond., No. 14 solid, 100 feet or more, per foot.....$ .08
Electric rubber cable, 4 cond., stranded, No. 18, water and oil resistant; run in parallel No. 16; 100 ft., $4.25; 250 ft., $10.00; 500 ft., $19.00; 1320 ft. reel.....**$49.00**
Electric rubber cable, 2 wire, stranded, No. 12; 50 ft. with plug and lugs.....**$7.00**
Electric rubber cable, 3 wire, stranded, No. 10; 65 ft. with lugs, Val. $25.00...**$13.00**
Electric rubber cable, 3 wire, stranded, No. 10, submarine cable, underwater, underground, overhead—50 ft., $15; 100 ft. $30; 250 ft. $75; 500 ft.....**$125.00**
Electric rubber cable, 2 wire, stranded, No 6—150 ft. reels, with 1 male connector; 2 female, crouse hinds connectors—Value, $211.00.....**$75.00**
Electric rubber cable, 2 wire, No. 4—75 ft. lengths, male & female connectors..**$50.00**

BLOCK AND TACKLE

70-Foot ¾ rope, 1 double block, 1 single block—both have swivel hooks, galvanized tensile strength, 4000 lbs.; No. 6 block, 3½" wheel; weight 27 lbs. Value, $27.00. Price.....**$9.95**

HORNS and HOWLERS

Motor driven, (not a vibrator). Heavy duty with great power and long life. Adjustable for high, medium or low tone. 110 volt AC current. Weather proof. For alarm or signal horn on boats, school yards, factories, etc. List price $47.00. NEW **Stock #382**. Your price **$12.48**.

and other bargain items

HEAVY DUTY GRINDER 1 HP, 1800 RPM, 3 phase, 220 Volt 60 cycle, 20 ft. cord, 24" Long, GUARANTEED. Mfg. by Thor & Chicago Pneu. Special SALE PRICE.....**$39.50**
PORTABLE HEATERS for Contractors Lauson gas engine with supercharger blower **$149.00**
PREVENT FROZEN WATER PIPES! Thermostat with 60 ft. of flexible, (wrap around) lead heating cable.....**$19.95**

ALL ITEMS GUARANTEED AS REPRESENTED

C & H ELECTRIC Co.
438 W. JUNEAU AVE.
MILWAUKEE 1 WISCONSIN

INVENTORS

If you have a PATENTED or PATENT PENDING Invention TO SELL or LEASE Request our FREE book

(No Obligation)

U.S. PATENT EXCHANGE

406 SOUTH SPRING STREET (Suite M) LOS ANGELES 13, CALIF.

MAKE GOOD MONEY in

Television Servicing

340 pages
170 illustrations

Symptoms of defective operation easily recognized, quickly corrected by illustrations, diagrams and how-to-do-it facts in this new book.

TV is expanding—and it pays big!

Get this brand-new, complete handbook for sure-fire working knowledge of TV installation, maintenance and trouble-shooting. Tells you step-by-step procedures for audio IF alignment, video IF alignment, aligning RF amplifiers, mixers, oscillators, etc. All possible defects classified for ready reference, thoroughly analyzed to show what is wrong and why . . . and what to do to correct the defect. No mathematical knowledge needed! Practical, authoritative, up-to-the-minute, the perfect handbook for set owners, trainees, and repairmen.

USE IT 10 DAYS FREE

Coupon below brings you "Television Servicing" on FREE trial for 10 days, without obligation. Mail it NOW.

PRENTICE-HALL, Inc., Dept. M-PS-151
70 Fifth Ave., New York 11, N. Y.
Send me, for 10 DAYS' FREE TRIAL, "Television Servicing." I will return it in ten days and pay nothing—or keep it and send $1.35 down (plus postage) and $2 monthly for 2 months.

NAME.....

ADDRESS.....

CITY.....STATE.....

☐ SAVE! Send $5.35 with this coupon, and we'll pay postage and packing.

d-con will help you WIN the

WAR ON RATS

FAMOUS WARFARIN FORMULA

New University of Wisconsin Discovery Clears Out Whole Colonies Completely

d-con with Warfarin will turn the tide for you in the War on Rats and Mice. This famous new formula, recommended by Federal Depts., county agents and the Farm Press of America, has proved its miracle result producing action in hundreds of controlled and supervised tests. d-con with Warfarin is a painless killer—safe and easy to use—yet it spells sure doom to rats and mice.

RELATIVELY SAFE TO LIVESTOCK AND PETS

Because d-con is cumulative in its killing effect and several days' successive feeding is necessary, it is relatively safe to larger animals. Rats and mice develop no bait shyness to d-con. They come back to the same feeding stations day after day—and a few days of this spells FINIS to your problems with rats and mice. With miracle working d-con you can clear your place of rats and mice once and for all—or your money back without question.

GUARANTEED TO CLEAR YOUR PLACE OF RATS

Just feed d-con with Warfarin according to the simple instructions that come to you with the package. Give it an honest ten day test. All signs of rats and mice will disappear. Your money back without question if it fails. No need to put up with rats and mice another day.

YOUR MONEY BACK IF d-con FAILS

d-con with Warfarin—enough to clear the average place of all rats and mice, costs you only $2.98. A small price to pay for clearing your premises of these destructive, disease spreading pests. Order today. Use the coupon below.

★ Enough d-con to clear your place of rats
Only
$2.98
★
d-con Company
531 W. Webster Ave., Chicago 14

HANDY MAIL ORDER COUPON

d-con Company, Dept. PS-1
531 W. Webster Ave., Chicago 14, Illinois

Please ship immediately d-con WARFARIN concentrate on your money-back guarantee.
( ) Ship C.O.D. I'll pay $2.98 plus C.O.D. postage.
( ) I enclose $2.98. Please send postpaid.

NAME.....

ADDRESS.....

CITY.....STATE.....

MANY NEVER SUSPECT CAUSE OF BACKACHES

As we get older, stress and strain, over-exertion, excessive smoking or exposure to cold sometimes slows down kidney function. This may lead many folks to complain of nagging backache, loss of pep and energy, headaches and dizziness. Getting up nights or frequent passages may result from minor bladder irritations due to cold, dampness or dietary indiscretions.

If your discomforts are due to these causes, don't wait, try Doan's Pills, a mild diuretic. Used successfully by millions for over 50 years. While these symptoms may often otherwise occur, it's amazing how many times Doan's give happy relief — help the 15 miles of kidney tubes and filters flush out waste. Get Doan's Pills today!

"How to Make Money with Simple Cartoons"

A book everyone who likes to draw should have. It is free; no obligation. Simply address

FREE BOOK

CARTOONISTS' EXCHANGE
Dept. 191-A Pleasant Hill, Ohio

WALKIE TALKIES $3.99 SET OF 2

POCKET SIZE —ELECTRONIC VOICE POWERED

No tubes, batteries, adjustments, license or permit needed! Guaranteed to work anywhere up to ¼ mile with extra wire. Swell for room to room—garage to house, etc! Your own private, talk-listen phone. Not war surplus. Brand new. Guaranteed. Two complete units with wire —READY TO USE!

SEND $1.00 deposit and pay postman $2.99 plus postage charges or send $4.25 for postpaid delivery. Limited Supply available.

THE MIDWAY COMPANY, Dept. WPS-1, Kearney, Nebraska

EARN MONEY IN UPHOLSTERING

BUSINESS OF YOUR OWN OR A GOOD JOB

Learn at home from experts. Simplified, fully illustrated training program. Full plans for establishing your business—profits big. Fine earning opportunities also in good jobs. Upholster your own furniture at fraction of cost. Valuable booklet free. Write now.

PROFESSIONAL HOME TRAINING—TOOLS, SUPPLIES, EQUIPMENT INCLUDED

GENERAL TRADES SCHOOLS, 3810 Broadway, Dept. PS-1, Chicago 13, Ill.

Be a DETECTIVE

A CHALLENGE FROM WASHINGTON, D. C.

Help Stop Crime! Train at home. Earn big money. Amazing training course from the NATION'S CAPITOL (center of law enforcement) by former U. S. GOVT. AGENT and NAVAL INTELLIGENCE Officer exposes actual methods used by Criminals. Write for FREE BOOK. State age.

INTERNATIONAL DETECTIVE SYSTEM

INTERNATIONAL DETECTIVE TRAINING SCHOOL
1701 Monroe St., N.E. Dept. 211 Washington 18, D. C.

WANT TO Write Stories Articles Mysteries?

FREE LESSON shows how you learn at home

The demand for writers is creating great new opportunities and it's not as hard to succeed as you may imagine. At home, you may learn fiction writing, best basis for all fields: short stories, radio & TV, articles, business items. Palmer training is endorsed by famous authors, scores of successful graduates. Complete instruction, professional coaching. FREE book and lesson show how you may enjoy an ideal part-time or full-time career. Write TODAY (no salesman will call). Approved for veterans: advise if eligible.

PALMER INSTITUTE OF AUTHORSHIP, Since 1917
1680 N. Sycamore, Hollywood 28, Calif., Desk U-11

"A FASCINATING...MONEY-MAKING

art career can be yours

America's 12 Most Famous Artists Show You How!"

says STEVAN DOHANOS

We show you our successful methods and art secrets...you learn them at home, in your spare time. Write for our big, handsomely illustrated free booklet that tells how you can have a great new art career! WRITE TODAY!

FAMOUS ARTISTS COURSE

Dept. 11-M, Westport, Conn.

FREE Please send book about your home study art course.

Mr. Mrs. Miss ..... Age .....

Street .....

City, Zone, State .....

FACULTY

Norman Rockwell, Jon Whitcomb, Stevan Dohanos, Peter Helck, Harold Von Schmidt, Fred Ludekens, Al Parker, Ben Stahl, Robert Fawcett, Austin Briggs, John Atherton, Albert Dorne

ADVERTISEMENT

Do We Have to Die?

THIRTY-NINE years ago in forbidden Tibet, behind the highest mountains in the world, a young Englishman named Edwin J. Dingle found the answer to this question. A great mystic opened his eyes. A great change came over him. He realized the strange power that knowledge gives.

That Power, he says, can transform the life of anyone. Questions, whatever they are, can be answered. The problems of health, death, poverty and wrong, can be solved.

In his own case, he was brought back to splendid health. He acquired wealth too, as well as world-wide professional recognition. Thirty-nine years ago, he was sick as a man could be and live. Once his coffin was bought. Years of almost continuous tropical fevers, broken bones, near blindness, privation and danger had made a human wreck of him, physically and mentally.

He was about to be sent back to England to die, when a strange message came—"They are waiting for you in Tibet." He wants to tell the whole world what he learned there, under the guidance of the greatest mystic he ever encountered during his 21 years in the Far East. He wants everyone to experience the greater health and the Power which there came to him.

Within ten years, he was able to retire to this country with a fortune. He had been honored by fellowships in the world's leading geographical societies, for his work as a geographer. And today, 39 years later, he is still so athletic, capable of so much work, so young in appearance, it is hard to believe he has lived so long.

As a first step in their progress toward the Power that Knowledge gives, Mr. Dingle wants to send to readers of this paper a 9,000-word treatise. He says the time is here for it to be released to the Western World, and offers to send it, free of cost or obligation, to sincere readers of this notice. For your free copy, address The Institute of Mentalphysics, 213 South Hobart Blvd., Dept. A-12, Los Angeles 4, Calif. Readers are urged to write promptly as only a limited number of the free books have been printed.

TRADES THAT PAY OFF
In Defense & In Industry

Jewelry-Stone Setting

WATCHMAKING

Engraving

"3 High-Paying Trades in 1 Career"

Serve in Emergency—Profit in Industry

Increasing needs in industry—defense—the trades—for thoroughly trained men.

Write for catalog and full information—also inquire about chronograph and correspondence courses.

MAIL THIS COUPON TODAY

KANSAS CITY SCHOOL OF WATCHMAKING
1218 Admiral Blvd.
Kansas City 6, Missouri

Please send me, without obligation, complete information on training in the above courses.

Name _____

Street _____

City _____ State _____

☐ Check if Veteran G. I. Approved

USE YOUR BENCH SAW
FOR JOINTING & CUTTING MOULDINGS

With our six inch tool steel cutters make mouldings, casings, drop-leaf tables, grooves beading and jointing. Moulding cutters, A 1 in. wide $1.75. 1½ in. $2.25. Jointing cutters, B 1 in. $1.75. 1½ in. $2.25. E 1 in. for drop-leaf tables. $1.75. E 1½ in. Makes ¾ in. cove & Quarter. $2.25. Postpaid. Guaranteed. State size hole. List & Folder free.

JOHN A. SANDSTROM
Rt. 2-P. Clearwater, Fla.

TUBE GIVEN WITH EVERY TIRE AT NO EXTRA COST

WRITTEN GUARANTEE SENT WITH EVERY TIRE YOU BUY

PLEASE NOTE: Our Tires are NOT Re-Treaded or RE-CAPPED We serve TRUCKS — BUSES — PASSENGER CARS

GOOD ORIGINAL TREAD USED TIRES

WE PERSONALLY SELECT YOUR TIRES A TRIAL OF ONE TIRE WILL CONVINCE YOU.

SEND CHECK OR MONEY

ORDER IN FULL WITH THIS AD NOW

These Are Original Tread Tires — OUR BEST GRADE

ONE QUALITY — ONE PRICE ONLY
TUBE GIVEN WITH EACH PASSENGER & TRUCK TIRE AT NO EXTRA COST — SEND THIS AD!

550-15	$5.32	670-15	$5.92	710-15	$6.22	760-15	$6.22
600-16	5.32	700-15	6.32	750-16	6.72	820-15	6.22
650-15	5.72	700-16	5.72	750-17	8.92	525-18	5.72
650-16	5.72	700-17	7.92	760-15	6.22	550-17	5.72

600-20	$9.72	32x6(8)	$10.22	1000-20	$17.22
650-20	9.72	32x6(10)	11.72	1100-20	17.22
700-20(8)	10.72	825-20	16.22	1000-22	19.22
750-20(8)	12.22	900-20	16.22	1100-22	17.22

Thousands of tires shipped all over U.S.A. All tires shipped F.O.B. Phila. Send Check or M.O. with this ad. Dept. 2. If your size is not listed write for prices. 17 YEARS AT THIS ADDRESS.

STANDARD 834 N. Broad St., Philadelphia 30, Pa.

SPEED AND POWER Handbook

90 CHAPTER LIBRARY EDITION

Photos Drawings 128 ENAMELED PAGES

Build Fast Stock Cars! California Roadsters! 160 MPH Rods! Covers Crosleys to Cadillacs—all makes—Authentic—Direct from California!

Tens of thousands have been sold!

SAVE SAVE SAVE

Build your own Dual Manifolds! Superchargers! Hot Cams! Water Injectors! Hi-Compression Heads! Mileage Devices! **Get up to ten more miles per gallon!** Get racing speed, lightning acceleration, dynamic power increases from any make passenger automobile! Get construction drawings! Tuning techniques! Speed tricks! Economy secrets! Ingenious formulas! Covers "Racing Frames"—"Reciprocating Masses"—"Jet Engines"—"Wheel Geometry"—"Dynamometers"—Dual Pipes, Gears, Fuels, Porting, Relieving, Lowering! Balancing—50 breathtaking chapters!

Includes **"CALIFORNIA CUSTOMIZING"**—Diagrams! Newest Ideas! Restyling all makes! Plus **1951 Racing Catalogue. Plus big "Economy Manual!" and "Alcohol Injection."**

SPEED SHOP METHODS 300 ILLUSTRATIONS

5 ITEMS Postpaid $1.98

NEWHOUSE AUTOMOTIVE INDUSTRIES
5805 EAST BEVERLY BLVD. DEPT. A4
LOS ANGELES 22, CALIF.

BLOOD PRESSURE GAUGE

and STETHOSCOPE . . . . . **$5.98** Keep check on yourself! Prevent strokes, kidney damage, etc. Manual has full details on what is prescribed in 95% of ALL high blood pressure cases. You get a Blood Pressure Gauge, Arm Bandage, Sleeve, 2 Valve Bulb, Base, Stethoscope and 25 Grams of MERCURY. **Send a $2.00 deposit and pay postman $3.98 plus C.O.D. charges or send a $5.98 money order and we will pay postage.**

JOY SPECIALTY COMPANY
Scientific Instrument Department
2320 W. Hubbard St., Chicago 12, Ill.
Details on request. (Dealers Wanted)

CHALLENGE! LEARN CALCULUS!

Teach yourself and others the principles of

HIGHER MATEMATICS—CALCULUS

Our easy-to-understand book "A New Concept of the Fundamentals of Calculus" gives you in simple language a new explanation of this powerful method for solving various problems. Get this book now—if you decide not to keep it after 30 days study, return it and your money will be refunded.

$2.00 postpaid

Richard Thomsen 500 Cathedral Parkway New York 25, New York

BOYS! MAKE YOUR OWN RADIO

Make your own simple, tubeless, batteryless Crystal Radio. SEND 25c for a GENUINE MELOMITE CRYSTAL with complete illustrated instructions for making your own set. Crystal sent postpaid with instructions and our own publication, "THE MAGIC CRYSTAL" which is full of news, diagrams, questions and answers of interest.

SEND 25c FOR YOUR CRYSTAL TODAY!

ALVA ALLEN RADIO Dept. 153 Clinton, Mo.

HISTORY-MAKING TANKS

Accurately scaled, exact replicas by Authenticast

Miniature models that are the duplicates of the ones used in pre-combat and recognition training and that are scaled replicas of the EXACT SAME American and Russian Tanks currently used in combat figiting. Full line of miniature fighting equipment including: Sherman, Gen. Scott and Stalin Tanks, Jeeps, Armored Cars, Tank Destroyers, Landing Vehicle Tanks.

Scaled 1" to 108".

Send for the Authenticast catalogue, now only 25¢.

COMET METAL PROD. CO., INC. • Richmond Hill 18, N. Y.

TODAY'S BIGGEST PREFAB BOAT BUY

Build a better boat than you can buy. Save up to 55%. See OZARKA'S deluxe line of trim, top-quality 12- and 14-footers, with exclusive laminated rib construction, all-oak frame and other features, for motors up to 25 H.P. Send 25c for complete Boat & Accessory Catalog, to be refunded on first purchase. OZARKA, INC., 711 BORDEN LANE, WOODSTOCK, ILL.

$200 GROSS IN MY FIRST WEEK!

Some Make More, Some Less . . . Start This Business for YOUR OWN

FREE BOOK! MAIL COUPON

VON SCHRADER MFG. CO.
111 Pl, Racine, Wis.

Send at once (no obligation) your FREE booklet containing information about your Electric Rug Washer and how I can own my own permanent, profitable business.

Name_____

Address_____

City_____ (Zone)____ State____

Would YOU like to own a permanent, year-round business in which it is possible to take in as much as $200 gross the first week, as did L. A. Eagles? R. E. Traynor says, "I made $62 gross in one day." R. R. Newlin reports, "I have averaged $173 gross per week." Others report gross from $100 per week to $12,000 per year.

Surely YOU will want to investigate a golden opportunity like that. You need not have any special skill or experience, but if you are ambitious, honest and courteous, we will help you to start and succeed in YOUR OWN money-making business where net profits are high.

No Shop Necessary

Our Electric Rug Washer cleans rugs and carpets like new right on the customer's floor. This quick, thorough and highly efficient method removes dirt and grime, thus restoring the natural, fresh beauty of floor coverings. Anyone can run it. Rugs and carpets are not harmed.

There are hundreds of possible customers in YOUR vicinity. Most of them have several rugs needing regular cleaning. To get a quick start, shampoo a few rugs or carpets. These customers tell their friends and soon you should have an independent, prosperous business, and you should be able to keep it growing. Send the coupon RIGHT NOW for booklet that explains everything.

Every Machine Guaranteed and Easy to Own

You take no risk. These wonderful, fully guaranteed machines have been used and endorsed by largest hotels, railroads—also used by U. S. Government. Many individuals have built up successful businesses that made big profits. Mail the coupon TODAY and we will send complete information, including how to start and succeed in YOUR business **without a large investment.** Don't delay your BIG opportunity. Send the coupon AT ONCE.

MAIL COUPON TO VON SCHRADER MFG. CO., 111 PL., RACINE, WIS.

WORK SHIRTS

10-DAY TRIAL
Orders Filled Promptly

79c
3 for 2.25

AMAZING VALUES!

SAVE money! These are surplus stock from a big supply firm. Sturdy, serviceable work shirts, though used, have been washed, sterilized and reconditioned. Every shirt of long-wearing wash materials. Blue, tan, white. Strongly sewn; reinforced stitching at points of strain. Money back guarantee!

WORK PANTS TO MATCH.....99c
Blue, Tan, White. Send waist measure and leg length.

SHOP COATS.....1.49
Blue, tan, white. Send chest measure.

SEND NO MONEY!

Give name, address, city or town, size and color choice, (also state 2nd color choice). Pay postman, plus postage. Or send cash and we ship prepaid. Keep 10 days. If not satisfied, return for refund! *Order Now!*

YOUNG DISTRIBUTING CO.
Dept. M-S, 2605 Elmhurst Detroit 6, Mich.

Don't Envy The PLUMBER·Be One

Make $15 to $50 a Day

Every skilled workman will tell you Plumbers have the best of it. WINTER and SUMMER the Plumber is busy at top wages. No skilled Plumber is ever out of a job. Compare his opportunities with any trade. To the man with know how, Plumbing means profit. Investigate Universal Plumbing School. Not a "war born School," but a plumbing school developed and operated by plumbers since 1923.

Own Your Own BUSINESS

Have your own business and big profits with little other than training and a kit of tools.

JOURNEYMAN Gets Good Salary

Master Plumbers own their own shop. A Journeyman works for a Master. With this training journeymen can depend on high wages.

BE A PLUMBER IN JUST 32 WEEKS

Learn With Tools—Not Books

No need ever serve an apprenticeship. Don't envy the plumbers big profits—enjoy them. Learn every trick of the trade—Leadwork—Blueprint for plan reading, etc. under Licensed Master Plumbers.

Over 7,000 Successful Plumbers Recommend This School

This system has made more than 7,000 plumbers. Investigate our past performance. If you like to work with tools this is your opportunity. Become a Plumber in America's largest and only school devoted exclusively to plumbing. Write today for FREE information.

G. I. Approved. Established 1923

UNIVERSAL PLUMBING SCHOOL
800 Holmes Kansas City, Mo.

AUTO BOOKS ON APPROVAL

SEND NO MONEY. Just mail the coupon for a complete set of 4 Big, Thick Auto Books. 20th Edition. Over 2700 Pages! Whether you are a mechanic or helper, expert or apprentice, auto owner or driver, take immediate advantage of this **FREE EXAMINATION OFFER.**

MAKE GOOD MONEY NOW HOLD A PERMANENT JOB

America wants its automobiles kept in good repair. Men with "know how" are in demand, at big pay. These books will help you get and hold an important job, or give you a chance to go into business for yourself now or later. Any man who half tries to improve himself can learn auto servicing and repairing by this quick reference method. Use the JIFFY INDEX to find easily understood answer to any auto problem. These wonder books prepared by eleven of America's great automobile engineers. Many hundreds of valuable illustrations. Send the coupon TODAY.

CAN YOU FIX IT?

These wonder books tell step by step HOW to make difficult repairs and adjustments, how to keep a car at maximum efficiency, including latest improvements in car design and operation. Engine troubles and how to correct them well covered.

6 BIG, THICK VOLUMES

Over 2700 pages, 2000 illustrations, wiring diagrams, etc. Beautiful modernistic, washable cloth binding.

A year's consulting privileges with our engineers now given with these books without extra charge.

Publishers Since 1898

AMERICAN TECHNICAL SOCIETY, Dept. A120
Drexel Ave. at 58th St., Chicago 37, Ill.

I would like to examine your 4 Volume Set of Auto Books. I will pay the delivery charges only, but if I choose I may return them express collect. If after 10 days' use I prefer to keep them, I will send you $3 and pay the balance at the rate of only $4 a month until $24.80 has been paid. Include consulting service as offered above.

Name .....

Address .....

City ..... State .....

Please attach letter stating age, occupation, employer's name and address, and name and address of at least one business man as reference. Men in service, also please give home address.

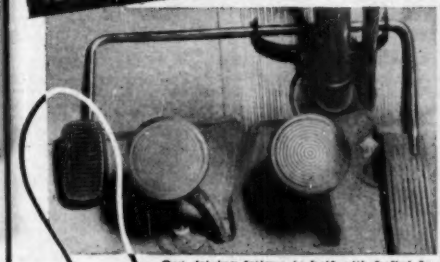
LEARN RADIO-ELECTRONICS

Train for an important job in Radio, Television and Radar—with unlimited future. Spartan resident study is backed with actual construction and operation.

Write Department PS-11

SPARTAN SCHOOL of RADIO-ELECTRONICS
MUNICIPAL AIRPORT • TULSA, OKLAHOMA

DRIVING RELIEF! New LEFT-FOOT ACCELERATOR



Cut driving fatigue in half with Lefty! Install this new left foot accelerator yourself in 60 seconds with just a wrench—no alterations to your car are necessary. Enjoy relaxed comfort on long drives. Lefty lets you feed the gas with your left foot when you desire, relieves tension and fatigue in leg, back, and foot. Safe, positive and convenient. Swings out of way when not in use. Brings your car up to date. $5 ppd. Specify year and make. No COD's please

Dealer inquiries invited.

INVENTOR'S MARKETING LAB
De Young Bldg., 690 Market St., San Francisco, Calif.

FOAM RUBBER

FOR HOBBYISTS, CRAFTSMEN, EXPERIMENTERS

Lowest Prices—SAVE 50%

16 x 16 x 1½"...ea. $1.35	
16 x 22 x 1½"...ea. 1.75	
18 x 24 x 1½"...ea. 2.00	
24 x 24 x 1½"...ea. 2.75	

AUTO SEAT TOPPER PADS
Place under seat cover

24" x 60" x 1½"...ea. $3.95	
24" x 60" x 2"...ea. 7.95	
12" x 14" x 1½"...ea. 1.25	

Use for furniture cushion fillers, mattresses, Mattress pads, cushions. Foam Rubber is available in any size or thickness. Send For Free Price List. Immediate delivery. No C.O.D.'s. Add 10% for Postage & Handling to Above Prices. Please print.

RIOR RUBBER COMPANY, Dept. S-15
50 East 22nd St. Chicago 16, Ill.

TITE SEAL

For Heavy Gasketing and Caulking, General Repair Work on Automobiles, Boats, Fixtures

1 lb. Flat Can 40¢ each
3 CANS $1.00

It's indestructible, vibration proof, heat-proof, non-hardening. Grips tight, non-solvent. No shrink, crack or crumble. Makes excellent bolt bedding. Prevents noise, squeaks between wood joints and metal fittings. Seals all bolted and riveted metal seams. For high pressure connections. Can be coated with paint, varnishes, enamels, lacquers. Reg. $1.50 per can value.

ORDER FROM THIS AD! Prices F.O.B. St. Louis, Mo. Include postage with cash, bank draft, or M.O. MONEY BACK GUARANTEE!

VICKERS MF9 Hydraulic PUMP OR MOTOR

NEW!

Equipped with Gear Box. Ready to Install.

Pump is rated at 1,000 PSI, .600 cu. in. per rev., 8 GPM at 3750 RPM. Change rotation by reversing flow. Delivers up to 6 HP. Requires ½ to 6 HP to drive directly. ¾" inlet and outlet ports. Gear Box is equipped with ball bearing, bronze worm gear, 1⅞" dia. drive gear with clutch. Ratio 15 to 1. Three legs have ¼" holes for mounting. Size 11 x-6 x 4½ in. Gear Box may be detached from Pump and both used separately. Wt. 8½ lb. **$12.95**

MAIN SURPLUS & SUPPLY CO., Desk S-01
11 South 3rd St., St. Louis 2, Mo.

GOOD MONEY IN WEAVING

Earn money **at home** weaving rugs, carpets, etc., from old rags or new yarn—in your community! No experience necessary. 31,000 doing it with easy running **Union Looms** costing $59.50. Send for our **free booklet** today.

UNION LOOM WORKS
127 Factory St. BOONVILLE, N. Y.

Look —a 10½x4, 6-ply Tire, Tube, Machined Wheel and Bearing at a "give away" price. Supplied in two types:—

1. With Highspeed TIMKEN BEARING (with Grease Retainer) $8.95
2. With Slowspeed NEEDLE BEARING (with Grease Retainer) $5.95

Freight Collect (8½ lb.)

Ideal for Handcarts, Bogies, Trailers, Soapbox Racers, etc. A bargain from the world's largest stock of all types of Airplane Tires. Send your check or money order to:

Airplane Tire Co., 99 Hiway, Tulare S., California

OIL FILTER REFILLS...10c

Here's News! Ordinary toilet paper makes an ideal oil filter. Laboratory tests prove it cleans oil faster and better than popular makes of filter elements. All you need is a simple set of **RETLIF ADAPTER PLATES**...and you can start using ordinary toilet paper rolls in your present oil filter. For proof and descriptive literature, send name and address to:

RETLIF CORPORATION, Dept. 63
1239 No. Highland Ave., Los Angeles 38, Calif.

MEN! send for this MONEY-MAKING OUTFIT FREE

Make up to $15.00 IN A DAY!

Do you want to make more money in full or spare time . . . as much as $15.00 in a day? Then write for this BIG OUTFIT, sent you FREE, containing more than 150 fine quality fabrics, sensational values in made-to-measure suits and overcoats. Take orders from friends, neighbors, fellow-workers. No experience needed. You'll say it's the best way to make money you ever saw.

YOUR PERSONAL SUITS WITHOUT 1c COST to YOU!

Our plan makes it easy for you to get your own personal suits and overcoats without paying 1c in addition to your big cash earnings. This offer is limited Rush your name, address Today.

STONE-FIELD CORP., Dept. N-820
532 S. THROOP ST. CHICAGO 7, ILL.

Now Many Wear FALSE TEETH With More Comfort

FASTEETH, a pleasant **alkaline** (non-acid) powder, holds false teeth more firmly. To eat and talk in more comfort, just sprinkle a little FASTEETH on your plates. No gummy, gooey, pasty taste or feeling. Checks "plate odor" (denture breath). Get FASTEETH at any drug store.

SUCCESS CAN BE YOURS!

Would YOU like to have ALL THE LAWS OF SUCCESS in ONE COMPLETE COURSE—So you won't have to read hundreds of books to get it? Then write for FREE Booklet "The Master Mind" by Napoleon Hill. No Obligation. One student writes, "My salary went up from $50 a week to $8000 a year." Write today.

RALSTON PUB. CO. 148 Engineers Bldg. Cleveland, 14, Ohio

THE AMAZING VACU-LECTRIC WIND SHIELD WIPER UNIT

Completely electrifies all vacuum wipers without changing blades, mountings or any part of standard equipment.

Gives constant wiper blade action—No blind driving when ascending grades or when passing other motorists—Stops blades from freezing fast to windshield—Easy and quick to install—No holes to drill or threads to cut—Comes complete with all necessary parts ready for installation—Guaranteed for one year. PRICE ONLY..... **$19.95**

BONSER ENGINEERING
BOX 16 GILBERT, PA.

Will ship for $5.00 deposit—Balance C. O. D. Dealers wanted: Inquiries for discounts must be on letter head or enclose business card.

(Mention make and model of car when ordering)

GET THE WORLD'S GREATEST RADIO & TELEVISION CATALOG! FREE

ALLIED'S

212-PAGE GUIDE TO EVERYTHING IN RADIO & TV AT LOWEST PRICES

SAVE ON EVERYTHING IN RADIO AND TV

Save money on every purchase you make from the world's largest radio supply house! Send for ALLIED'S 212-page 1951 Catalog packed with *everything* in Radio and Television. Widest selections of home radios, TV equipment, phono-radios, Amateur equipment, P.A. systems, Hi-Fidelity music systems, recorders, test equipment, builders' kits—plus thousands of parts, tubes, tools, books and diagrams. Get more for your money—send today for your FREE 1951 ALLIED Radio and TV Catalog!

Everything for:
Servicemen
Engineers
Experimenters
Builders
Amateurs

Get Radio's Leading Buying Guide!

ALLIED RADIO

FREE CATALOG

ALLIED RADIO CORP., Dept. 7-A-1,
833 W. Jackson Blvd., Chicago 7, Ill.

☐ Rush FREE 212-Page ALLIED Catalog

Name.....

Address.....

City.....*Zone*....*State*.....

NO SHOP NEEDED

Operate YOUR OWN Business

Clean and Mothproof Rugs and Upholstery

SEE OUR COLUMN "AD" IN APRIL HOUSE & GARDEN

Can you qualify? . . . If you are dependable, honest and willing to work, send for FREE Booklet explaining how you can become "your own boss" in a growing business of your own. You'll use proven successful methods of established DURACLEAN Dealers. Service rendered "in the home," offices and public buildings. Easy to learn. No experience necessary.

DURACLEAN cleans by absorption! No scrubbing. No soaking or shrinkage. Fabrics dry in just a few hours. Dirt, grease and many unsightly spots vanish as if by magic . . . colors revive. Upholstery and floor coverings last longer.

DURAPROOF kills moths and carpet beetles. Makes material resistant to both! Another year 'round service. DURAPROOF, to our knowledge, is the only moth proof service backed by a National Money Back, 4 YEAR WARRANTY of protection. Also rendered "In the Home," at your customer's convenience.

These services are Nationally Advertised! Lending furniture and department stores recommend DURACLEAN Dealer's service. Almost every building in your territory houses a potential customer. Even auto dealers buy your service to revive upholstery in used cars. You get many voluntary and repeat orders.

Some dealers establish a shop or an office after business has grown. Others continue to operate from their own home. Profits up to $15 and $20 for a day's service on EACH of your service men. Territories are limited! Write now for FREE Booklet explaining details of these Nationally Advertised services.

Duraclean Co., 1-181 Duraclean Bldg., Deerfield, Ill.

NO CAR TROUBLE IS HARD TO FIND...

when you have MoTor's new "Trouble Shooter" Handy, pocket-size, indexed manual lists 1760 CAUSES of car troubles and tells WHERE to look for them. Saves you hours of time and work on difficult jobs. Covers engines, clutches, brakes, ignition, etc. Section on automatic transmissions *alone* is worth more than price of book! Spiral binding; book stays open while you work. Send no money—just pay postman $1, plus postage and C.O.D. charges. If not satisfied, return book in 7 days for refund. Or SAVE C.O.D. charges by sending only $1 NOW. Same return-for-refund privilege. **MoTor Book Dept., Desk 217, 250 West 55th St., New York 19, N. Y.**

Learn to MOUNT Birds and Animals

FUN-FASCINATION
PROFITS—IN SPARE TIME

Learn **TAXIDERMY** at home **BY MAIL.** Save your hunting trophies, decorate your home and den, have a grand **HOBBY.** This old reliable school (with 250,000 students) will teach you at home to mount **BIRDS, ANIMALS, FISH, GAME-HEADS**—and to TAN hides and furs by wonderful **KROME-TAN** system, also **NOVELTY TAXIDERMY,** using common specimens—no wild game needed.

FREE BOOK 100 beautiful pictures. Tell how YOU can learn Taxidermy easily, quickly, at home. Tells how to **EARN FINE PROFITS** in spare time. Rush letter or postal for this strange marvelous **FREE BOOK.** Write NOW—TODAY. State AGE.

N. W. School of Taxidermy • DEPT. 2601 Omaha, Neb.

TRY HOME STUDY WATCHMAKING

FREE Sample Lesson

Famous Sweazey System shows how to master watchmaking . . . expertly, quickly, successfully . . . right in your own home. No previous experience needed to learn one of the highest paid trades. Try it without obligation.

G. I. APPROVED RESIDENT COURSES

. . . in Watchmaking, Engraving, Jewelry Repair, Diamond and Stone Setting at our modern, fully-accredited resident school. Founded 1908. Write for FREE CIRCULAR.

CHICAGO SCHOOL OF WATCHMAKING
1608 N. Milwaukee Avenue, Dept. 411, Chicago 47, Ill.

RUPTURE-EASER

Right or left Side $3.95

Double $4.95

NO FITTING REQUIRED

A strong, form-fitting washable support. Back lacing adjustable. Snaps up in front. Adjustable leg strap. Soft, flat groin pad. No steel or leather bands. Unexcelled for comfort. Also used as after operation support. For men, women and children. Mail orders give measure around the lowest part of the abdomen. Specify right or left side or double. We Prepay Postage Except on C.O.D.'s.

PIPER BRACE CO.
308 East 12th Dept. PS-151 Kansas City 6, Mo.

ELECTRIC SHEAR SHARPENER

Over 70,000 Sold—It Must Be Good!

Genuine Carborundum wheel ideal for shop or home use. Send remittance with order and shipment will be made at once, prepaid to your door, complete with electrical goods catalogue.

Motor driven **$9.75** complete with vise

WILLIAM MARVY COMPANY, Dept. 10
479 St. Peter Street St. Paul 2, Minn.

AMERICA'S BIGGEST KAYAK VALUES

9' Kit $18.75
other sizes

Complete easy-to-assemble kits—full instructions—pre-cut parts—nothing left to chance—no steaming or bending—simple tools. Make lightweight, easy-to-carry, speedy craft for fishing, duck-hunting or paddling. Strong and safe with lowest center of gravity. You can't beat these values.

Request Literature:
Dept. PS-1, DEDHAM KAYAKS, Dedham, Mass.

GREATEST SAVING EVER OFFERED!
U. S. GOV'T SURPLUS
"BARGAIN BOOK"

JUST OFF THE PRESS!
Greatest Bargain Book ever offered! Jam packed with low prices, terrific savings on scores war surplus.
Mail 10c TODAY - NOW - begin saving on hundreds of items for farm, home, shop, sports. Get your Bargain Book by return mail.

MAIL TODAY Only 10¢

500 BARGAINS • FARMS • SPORTS • HOME • SHOP

FISLER SALES CO.
723 WALNUT ST., DESK A-4, KANSAS CITY, MO.

EAR NOISES?

If you suffer from those miserable ear noises and are Hard of Hearing due to catarrh of the head, write us NOW for proof of the good results our simple home treatment has accomplished for a great many people. NOTHING TO WEAR. Many past 70 report ear noises gone and hearing fine. ***Send NOW for proof and 30 days trial offer.***

THE ELMO CO.

Dept. 815 Davenport, Iowa

TALK—SING—PLAY

OVER YOUR RADIO

with the real Radio Mike! Attaches in a jiffy—full instructions given! Swell for "parties"—"cut in" on or "kid" regular network programs or put on your own broadcasts! Amaze your friends—real fun. Beautiful Metallic Plastic 6 in. high!

12 RADIO BROADCAST LESSONS GIVEN with each mike

SEND NO MONEY Just pay postman $2.99 COD plus postage or send $2.99 and we pay postage! *Radio Mike* is available *only* from us by mail—*guaranteed.*

Midway Co., Dept. MPS-1, Kearney, Nebr.

HOT RUNNING WATER!

Attaches easily, quickly to any standard faucet. Regulates temperature by turning faucet. Operates AC or DC. Comes with 8-ft. rubber cable and plug. Our DELUX heater has delighted many thousands of users. Send $3.95 cash, check, or M.O.—we will ship prepaid or, if you wish, we will ship C.O.D.—you pay postman $3.95 plus few cents postage. Order 3 for $10—save $1.85.

METROPOLITAN ELECTRONICS CO.
Dept. 196, 106 Fifth Ave., New York 11, N.Y.

MAGIC TRICKS

IT'S FUN TO DO MAGIC

Be popular! Amaze—mystify—entertain! For 30 years Douglas has satisfied customers all over the world. Now you can enjoy this fascinating hobby. Only 10c brings you our new 1950 catalog 500 tricks, containing brand new tricks for pocket, parlor, stage. Join in the fun—send 10c tday!

DOUGLAS MAGICLAND
DEPT. P DALLAS, TEXAS

There's BIG MONEY *in*

UNIFORMS and Work Clothes that ADVERTISE!

Every business and businessman is swinging over to employee uniforms and work clothes, embroidered with company name, trademark, sales message, etc. The field is new. Prospects are everywhere — garages, service stations, factories, coal dealers, dairies — and hundreds more. Profits are huge. You take orders by the dozen and gross! One man made over $800.00 on a single deal! You get the business everytime because you offer latest style and finest fabrics. Big selling kit sent FREE!

TOPPS, Dept. 621, Rochester, Indiana

FREE 5-Day Trial

How to Make Your Own CABINETS, BOOKCASES and WALL SHELVES

NOW—You Can Build the Things You Want at Big Cash Savings — Without Expensive Tools

YOU don't have to be an experienced craftsman—you don't even have to understand blue prints. The amazing new GIANT-SIZE BIG HOME-PROJECT CRAFTSMAN MANUAL shows you step-by-step, with easy-to-understand illustrations how to make your own useful things for your home and earn or save hundreds of dollars. Here are detailed drawings so simple, that even a child can understand and follow. This HUGE new atlas-book guides you every step of the way on any of the 77 up-to-date projects you decide to make.

MAKE THESE THINGS
Wardrobe Chests, Dresser, Night Table, Breakfast Cupboard, Phonograph Record Cabinet, Modern Chest Units, Sewing Cabinet, Book Shelves, Wall Shelves and dozens of other pieces.

630 PHOTOS & DRAWINGS BIG BOOK 9" x 12"

Big Money-Market for Every Project Made

These hand built pieces of furniture whether they are a Chest, Cupboard, or Night Table bring many, many dollars in the market. Yes, you too, can share in the profits to be made in this lucrative field. Cash in on this golden opportunity of getting into a hobby that really pays off in gold dust.

Enrich Your Own Home

The 27 styles of cabinets alone, shown in this wonder-book can produce outstanding results for your home—watch your friends gasp when they see the practical bookcases (19 styles) and magazine racks you can make. You'll find yourself turning out modern cabinets, book shelves, hanging racks, chests and dozens of other things you need, "just like magic."

Follow Expert Advice

Scores of experts including furniture designers, woodworking instructors, master craftsmen and cabinet makers put their heads together to give you a book that will enable you to make the things you always dreamed of having.
Clear-cut photos guide you as you work. The complete drawings and dimensions shown make every job so easy you will marvel at how quickly you can turn out these fine pieces.

SEND NO MONEY Risk Nothing—READ on 5-Day FREE TRIAL

Just fill in coupon and mail. Use **CABINETS, BOOKCASES AND WALL SHELVES** for 5 days FREE. If not delighted, return the book within 5 days and owe nothing or keep it and send only the low price of **$3.95** (plus postage). **Order NOW!**

THE HOME CRAFTSMAN, Dept. PS 1, 115 Worth St., New York 13, N. Y.

5-Day FREE TRIAL COUPON

THE HOME CRAFTSMAN, Dept. PS1, 115 Worth Street, New York 13, N. Y. — **Mail NOW**

Please send me **CABINETS, BOOKCASES and WALL SHELVES.** If not delighted, I will return the book within 5 days and owe nothing, otherwise I will keep it and send you only **$3.95** (plus postage).

Name.....

Address.....

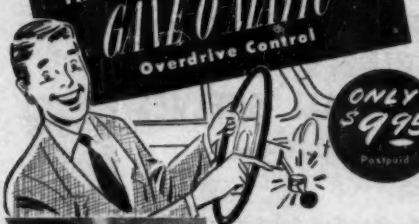
City & Zone.....State.....

☐ **SAVE.** Send payment (check or money order) NOW and We pay postage. Money back if not delighted.

THE AMAZING NEW

GANE-O-MATIC

Overdrive Control



ONLY $9.95 Postpaid

- SAVE GAS, BRAKES & TIRES
- ENJOY AN AUTOMATIC HILL HOLDER
- USE SIX FORWARD SPEEDS

THE GANE-O-MATIC ENABLES YOU TO FULLY UTILIZE ADVANTAGES OF YOUR PRESENT OVERDRIVE. FINGER-TIP CONTROL GIVES YOU THE OPTION OF SELECTING OVERDRIVE OR REGULAR RANGE AT ANY SPEED AND IN ANY GEAR.

A. Gas economy is achieved as the Gane-O-matic enables you to use overdrive 100% of the time. Gane-O-matic gives you down hill compression when in overdrive . . . thus saving tires and brakes when stopping.

B. The Gane-O-matic hill holder holds your car in position on any hill without the use of your hand or foot brake.

C. The Gane-O-matic enables you to use six forward speeds. Three each in regular and overdrive range.

THE GANE-O-MATIC IS EASILY INSTALLED IN A FEW MINUTES ON ALL FORD, MERCURY, LINCOLN, STUDEBAKER, CHRYSLER, DODGE, DESOTO, NASH, HUDSON, KAISER-FRAZIER, JEEPSTER AND OTHER CARS WITH OVERDRIVE.

MONEY BACK GUARANTEE If you are not fully satisfied with your Gane-O-matic, we will refund the entire purchase price if it is returned within 30 days.

FREE LITERATURE. Comes complete with illustrated installation instructions. Send cash, check, money order or $1 deposit on C.O.D.

NATIONAL AUTOMOTIVE RESEARCH CO.
Dept. X-1, 350 West Washington Blvd., Venice, Calif.

BE AN

AUTO MACHINIST

Draw Top Pay • No Job Worries

Earn more money in auto mechanics—Specialize! New FREE booklet tells how to prepare for good jobs with high pay and job security. Our modern equipment and practical instructions make it easy to learn—get experience in:

ENGINE REBUILDING or GENERAL AUTO MECHANICS

Job Placement Service FREE

Practical Shop Training Learn to operate the very latest shop machinery. Friendly instructors take a real interest in preparing you for a good job.

VETERANS American is a G.I. approved school.

WRITE TODAY FOR

FREE BOOKLET

AMERICAN TRADE SCHOOL
2507-I McGee Kansas City, Mo.

LAW FREE BOOK

Write today for FREE book, **"THE LAW-TRAINED MAN,"** which shows how to learn law for business and the bar easily in spare time at home through the famous Blackstone professional law course compiled by 60 expert law authorities including law college deans, professors, lawyers and Supreme Court judges. We furnish all necessary instruction material including big 18-volume Modern American Law library cited by the courts of last resort as "M.A.L." Many successful attorneys among our graduates. LL.B. degree conferred. Moderate tuition; low monthly terms. Money-back Agreement. Write today.

BLACKSTONE COLLEGE OF LAW
225 N. Michigan Ave., Dept. 121, Chicago 1, Ill.
A Correspondence Institution Founded in 1890

WAR SURPLUS

OPTICAL BARGAINS

SLIDE PROJECTOR SETS. Consists of all unmounted lenses you need to make the following size projectors:

Stock #4029-N—35 mm.	$2.85	Postpaid
Stock #4038-N—2¼"x2½"	$3.35	Postpaid
Stock #4039-N—2¼"x3½"	$3.35	Postpaid

MAKE A MICROSCOPE—Get wonderful results. Own an instrument worth many times the cost to you. Simply convert a U. S. Govt. Rifle-scope (Govt. cost over $65.00). It's easy! We show you how. No machining required. Get up to 40 Power. Scope we furnish is used but good condition . . . sent complete with extra lenses and direction sheet.

Stock #959-N	$7.90	Postpaid

10 POWER SPOTTING SCOPE—A WONDERFUL BUY! Pocket-Size! Complete with tripod and swivel head. Only 5½" long—8½" high on tripod. Adapted from Army telescope and worth many times our price. Has prism erecting system, achromatic objective, Ramsden Eye-Piece. Lenses low reflection coated.

Stock #955-N	$14.95	Postpaid

SIMPLE LENS KITS—Include plainly written, illustrated booklet showing how you can build lots of optical items. Use these lenses in photography and for dozens of other uses in experimental optics, building TELESCOPES, low power Microscopes, etc.

Stock #2-N—10 lenses	$ 1.00	Postpaid
Stock #5-N—45 lenses	5.00	Postpaid
Stock #10-N—80 lenses	10.00	Postpaid

We Have Literally Millions of War Surplus Lenses and Prisms for Sale at Bargain Prices. Numerous Types of Instruments. Too! Write for FREE CATALOG-N

EDMUND SALVAGE CO., BARRINGTON, NEW JERSEY

THROWING DAGGER $1 postpaid

This MALAYAN FIGHTING KNIFE is used for self-defense, killing game, target skill. Powerful, silent, accurate weapon. Splits 1" board at 30 ft.

Rebound to stick!

Fun, Thrills, Excitement! Indoors—outdoors. Learn this Sport! Easy to throw accurately with our clear instructions. Beautiful, heavy-duty 10" knife. Tempered steel. Tough, rawhide-bound handle. Rare souvenir, unusual bargain. Limited quantity. Sold direct only. Send $1 to Wholesale Import Co., Dept. 4, 604 S. Morengo, Alhambra, Calif.

MONEY IN HAMSTERS

The new wonder animals from Syria. Often called Toy Bears. Delightful pets. Everyone wants them. Laboratories use thousands. Clean, odorless. Raise anywhere. NOW, spotted and golden breeds. We furnish breeders, equipment and manual of instructions. Write today for free illustrated literature.

GULF HAMSTERY, 1540 Basil St., Mobile 17, Ala.

BATTERIES START A FACTORY AT HOME

—and re-cast junk batteries into new, with and without new materials; the latest achievement. We supply complete instructions and everything needed. Big Profits!

BATTERY LABORATORY SCHOOL
DEPT. PSM, MINNEAPOLIS 4, MINNESOTA

make your own Gems 29.50 F.O.B.

All necessary lapidary equipment is furnished, including a super-charged diamond blade for sawing, and all wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt, for only $29.50, f.o.b., Burlington, Wisconsin. Write today for information and literature.

B&I MANUFACTURING CO.
Dept. M Burlington, Wis.

SMALL! POWERFUL!

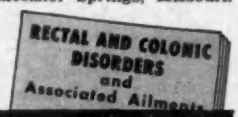
America's finest low cost tractor. Ruggedly built. Easy to operate. No belts, no chains. Borg-Warner clutch, trans. and diff. 140 to 1 reduction. 40% more drawbar pull than ordinary tractors. 3-1/4 H.P. engine—gasoline or kerosene. 20 quick change implements. Write for complete details.

ENGINEERING PRODUCTS CO.
915-A1 Niagara Ct., Waukesha, Wis.

How I Found Relief For PILES

If you are among the thousands of men and women who suffer from Piles, Fistula or other rectal disorders, take the first step toward finding relief from these treacherous conditions. Send for our Free Book which describes symptoms, and the treatment that has proved so successful for so many years. Write McCleary Clinic and Hospital, 171 Elms Blvd., Excelsior Springs, Missouri.

FREE BOOK GIVES YOU THE FACTS



WRITE FOR YOUR COPY TODAY

It's EASY to play The **MUSICAL SAW**

the Glass-O-Phone the Jazz-O-Nette, Musical-Pitchfork, Flute-O-Phone

If you can whistle or hum a tune, you can play these remarkable Novelty Instruments. They are played **entirely by ear.** Low priced. Write for **FREE** literature.

MUSSEHL & WESTPHAL, Est. 1921
19 FORT ST., FORT ATKINSON, WISCONSIN

LOWER YOUR CAR

CALIFORNIA STYLE

with the Original Clark Lowering Blocks

- *For greater safety at high speed*
- *Less body rolling in turns*
- *Less front end dip on quick stops*
- *Lowers rear end to front end level*

Complete kit only **$3.00.** Includes parcel post chg. 30 minutes to install—state make & year of car. Special kit for Ford & Merc 1932 to 1948 **$1.00**

Over One Million In Use

CLARK HEADER CO.
6990 E. Firestone Blvd., Downey, Calif.

GOLD - SILVER - COINS

Easily located with new Lightweight M-Scope Detector. Superior performance, lowest price, monthly payment plan.

FREE LITERATURE

FISHER RESEARCH LAB., INC.
PALO ALTO CALIF.

Easy to MAKE MONEY

WITH FAMOUS BOSTONIAN SHIRTS

Thrilling new money-making opportunity — spare time, full time, sideline — with NATIONALLY-KNOWN Bostonian Shirts. All styles, sizes, fabrics, colors. Dress and sport. Finest quality — sensational low prices. Also rainwear, slacks, underwear, women's wear, etc. No experience needed.

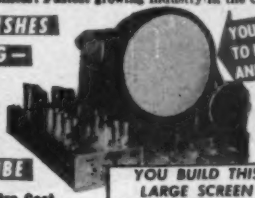
FREE SAMPLES

of fabrics and costly presentation. Just send name and address. See how easy it is to make exceptional money with old, reliable company. Send no money, but write Now!

BOSTONIAN MFG. CO., 89 Bickford St.
DEPT. A-41 - BOSTON 30, MASS.

Prepare now for high-pay jobs with SECURITY. Big demand for trained men! Get to the top faster through practical shop-training methods! You earn big money at home while learning; start your own business! Fastest growing industry in the country!

RTTA FURNISHES EVERYTHING — TUBES, BATTERIES, LARGE TV PICTURE TUBE



YOURS TO KEEP AND ENJOY

YOU KEEP ALL EQUIPMENT!

YOU BUILD THIS LARGE SCREEN TELEVISION RECEIVER

YOUR CHOICE OF 10, 12 - OR 16 INCH PICTURE TELEVISION TUBE

CAN BE CONVERTED FOR COLOR TELEVISION

FREE...At No Extra Cost... YOU GET A ROUND TRIP TO NEW YORK CITY

After completing home study training, your transportation both ways from any point in U.S. or Canada will be paid by RTTA. At our affiliated training shops in New York City you get 2 solid weeks of laboratory work on newest equipment.

YOU GET 15 BIG TELEVISION-RADIO KITS AT NO EXTRA COST. YOU BUILD THESE & THREE OTHER UNITS

RF SIGNAL GENERATOR

AUDIO OSCILLATOR

RTTA helps you earn while you learn. Open to men of all ages! RTTA prepares you for BIG PAY and to open your own shop.

DRAFT AGE MEN

Special "SPEED-UP" Radio Communications program helps you get BETTER SERVICE RATING—BETTER PAY! You can find out by return mail! Send Coupon TODAY!

FREE "SPEED-UP OFFER" COUPON

RADIO TELEVISION TRAINING ASSOCIATION
972 Broad Street, Dept. 181, Newark 1, N. J.

Rush me FREE Sample Lesson & Catalog "How to Make Money in Television," in spare time. AT HOME, while learning; also ( ) Special Home Plan for Men over Draft Age. ( ) "Speed-Up" Service Rating Plan for Draft Age Men. No obligations! I understand no salesman will call.

Name.....Age.....

Address.....

Stucco Spraying Can Be Your Opportunity

You can build a profitable, lifetime business with Colorcrete. Large waiting market. Work is easy and interesting. Moderate investment; high return. Large waiting market. Full instructions and liberal co-operation.

Sprayed-On Beauty

Colorcrete is modern beauty treatment for masonry surfaces — exterior and interior. Fuses to concrete, stucco, etc. Applied by air pressure. Range of many smart colors. Proven by 20 years of use on all kinds of buildings.

Write or wire for Opportunity Book.

COLORCRETE INDUSTRIES, INC.
572 Ottawa Ave., Holland, Mich.

IT'S NEW!

$49.95 11"x7"x7" SW-54

It's Terrific!

TUNES ALL MAJOR BROADCAST AND SHORTWAVE BANDS!

Hear foreign stations, ships, radio amateurs and police, plus standard broadcast programs on this amazing table radio built by the world's leading maker of communication radio equipment. Covers 540kc. to 30mc. AC/DC operation. In smart unbreakable metal cabinet. For details and name of nearest dealer, write

National COMPANY, INC.
61 Sherman St., Malden, Mass.

Handy Flexible SHAFT

With 1/8 Inch Adjustable Chuck

ONLY $3.95

OLD FAN MOTOR

VACUUM CLEANER MOTOR

Converts any motor, drill press, electric grill, electric fan (10 inch or larger) into a handy rotary tool.

Attach ROTA-SHAFT in a jiffy. Use for grinding, polishing, sharpening, cleaning, engraving, making tools, carving on metal, plastic, wood, leather, glass. **Handles tools from zero to 1/8 inch diameter.** 40-inch overall length. Complete with buff and sanding disc ready to use in a drill press chuck. ORDER TODAY!

SEND NO MONEY! Mail your order. Pay postman only $3.95 plus postage on delivery. Try 10 days — if not delighted return for money back. **For use on motor—35c extra for Special Coupling. Give exact size of motor shaft diameter.**

STRADER PRODUCTS CO., Dept. S-102
259 Strader Ave. Cincinnati 26, Ohio

new RIVET-KRAFT KIT Only **$1.65**

1001 USES

It's Easy to Rivet metal, plastics, leather, moving parts. METALCRAFT, models, noveities. REPAIR appliances, toys, tools, furniture, etc.
HANDIEST Kit for HOME or SHOP. Contains assortment of 3/32" and 1/8" semi-tubular rivets, washers, 2 steel clincher tools, and instructions. Send only **$1.65**, ppd.
(Calif. Residents add 5c Sales Tax)

Money-back guarantee. **LLOYD'S CRAFTLINES, Dept. PS-1**
921 E. Cedar Ave. BURBANK, Calif.

GIANT BALLOONS

U. S. Govt. Surplus. Genuine Neoprene. Used by Govt. for weather & Target Balloons. Loads of fun for yards, pools, gym, parties. Wonderful for Advertising: Attracts immediate attention.

Postage paid on pre-paid orders.	3 Ft. Dia.	39c
	6 Ft. Dia.	79c
	13 Ft. Dia.	1.39

VOLUME SALES CO.
3828 Sunset Blvd., Los Angeles, Calif.

FREE TO THE RUPTURED

3 WEEKS' SUPPLY TRUSS EASER POWDER

Don't throw your present truss away. Famous Easer powder will let you wear it with solid comfort. This soothing medicated powder helps prevent chaffing, rubbing and gouging. It soothes tender skin—helps prevent inflammation. Six months' supply only $1.00 postpaid. Generous 3 weeks' supply absolutely free. Write today!

TRUSS EASER LABS, Dept. PS1, 2335 Cottage Grove, Chicago 16

FANS! FANS!

ALL TYPES — ALL SIZES

Kitchen Ventilators, Exhaust Fans, Attic Fans, Blowers, Heat Boosters, $7.95 up, Desk Fans, Window Fans, Blades, Guards, Shutters, Motors, etc.

Send 10c for illustrated catalogue

EDWARDS BROS. ESTAB. 20 YEARS
WESTERN APPLIANCE CO., INC.
5650 Grand River Ave., Dept. F, Detroit 8, Mich.

AUTO MECHANICS
BODY-FENDER REPAIR
DIESEL MECHANICS
ELECTRICITY
RADIO & TELEVISION
REFRIG-ERATION
MECHANICAL DRAFTING
BUILDING CONSTRUCTION
HIGH SCHOOL
FOREMANSHIP
FACTORY MANAGEMENT

Better Learn a Trade

If you're a veteran, you haven't much time left for learning a trade under the G.I. bill. *Better get started!*

If you're *not* a veteran, there's no time to be lost, either. Opportunities for success were never better for really *trained* men.

C.T.I. trains you for success either *at home in your spare time or in our resident school*, in just a few months. *Mail coupon for valuable booklet.*

COMMERCIAL TRADES INSTITUTE
1400 Greenleaf Ave., Dept. 81-1
Chicago 26.

☐ Veteran ☐ Non-Veteran

Name_____ Age____

Address_____

City & State_____

Course_____

Say You Saw It In Popular Science

BE YOUR OWN BOSS - *AND KEEP THE PROFITS*

with amazing, beautiful new PEARL finish

Marvelous new finish can be applied permanently to *any* surface, giving a lovely, lustrous PEARL coating in *beautiful colors* to thousands of objects. YOU can start *right in your own home* WITHOUT ANY EXPERIENCE turning out these lovely PROFITABLE things and make a BIG INCOME—up to $5.00 per hour to start. The market for PEARL-KOTE finishes is TREMENDOUS—in the field of baby shoes covering *alone* there are 5 *million* new customers *every year*. Don't regulate your life to the other fellow's whim . . . BE YOUR OWN BOSS. Grasp this OPPORTUNITY of a lifetime TODAY. Get all the FREE details right now . . . SEND TODAY. Find out for yourself what PEARL-KOTE can do for you. SEND NO MONEY—simply fill out and mail the coupon at right to get all the FREE FACTS —BUT do it NOW!

FREE MAIL COUPON NOW FOR MY COMPLETE "GO IN BUSINESS ON A SHOESTRING PLAN"

START RIGHT AWAY! SPARE OR FULL TIME

PEARL-KOTE CO. DEPT. S-511 2111 W. MANCHESTER LOS ANGELES 47, CALIF.

MAIL COUPON NOW!

PEARL-KOTE CO., Dept. S-511
2111 W. Manchester Ave., Los Angeles 47, Calif.
Okay! RUSH me FREE FACTS at once.
Name_____
Address_____
City_____ Zone____ State_____

NEON SIGN SCHOOL

G. I. APPROVED

Learn Neon. 4 or 5 good jobs for every Acme grad. BIG PAY — $1.50 to $2.00 an hour to start. Our 12½ week Job-Practice Course trains you in Glass Blowing, Neon Tube Bending, Color Gassing. Trained Glass Blowers often get deferred. Course open to Vets and Non-Vets. Write for FREE FOLDER.

LEARN IN 12½ WEEKS

ACME NEON INSTITUTE, Dept. A-2
330 South Paulina St. Chicago 12, Ill.

LABORATORY TECHNICIAN

BE A LABORATORY SPECIALIST; complete course. Big demand from hospitals, doctors, clinics. We teach all branches of medical laboratory work, including **Medical and Dental X-Ray.**
Approved by American College of Medical Technologists
Co-educational Free Placement Bureau
Free Catalog—Accredited for "veteran" training

CHICAGO COLLEGE OF LABORATORY TECHNIQUE
Dept. P.S. 431 S. Wabash Ave. Chicago 5, Illinois

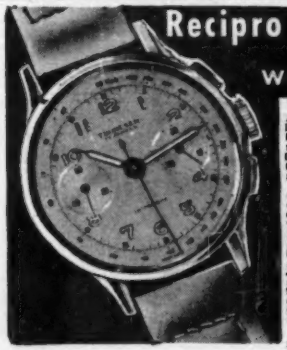
EYE-GLASSES BY MAIL

16 Days Trial

Write Today for Free Catalog. Send no Money

ADVANCE SPECTACLE COMPANY
537 South Dearborn Street, Dept. SP-1 Chicago, Illinois

When Writing to Advertisers Please Mention Popular Science



Recipro Register CHRONOGRAPH

WORLD FAMOUS SPLIT-SECOND TIMER

10 DAY FREE EXAMINATION

A handsome wristwatch of incredible *accuracy!* Precision made in the highest traditions of Swiss craftsmanship. Thoresen's new **RECIPRO-REGISTER CHRONOGRAPH** automatically computes speeds and distances down to 1/5th second tolerances! **RECIPRO-REGISTER** system **HOLDS** the result indefinitely. It remembers for you while movement **continues to keep time.** Compare with other stop-chronographs and you will never be satisfied with anything less than this truly precision timepiece.

OVER 25 HIGH QUALITY FEATURES!

- Times Planes
- Times Photography
- Shock-Resist
- Times Races
- Times Lab experiments
- It "remembers"
- Times Sports
- Times Shop Work
- 17 Ruby Jewels

Three multi-function dials automatically compiled and synchronized for hours, minutes, seconds & 1/5th seconds. Contact clutch to start computation and brake clutch to freeze Recipro-Register result. **Erases back to zero.** Hairline sweep-second. Radium-active dial. Unbreakable crystal. Sturdy, yet thin case with stainless steel back. Its 17 Jewel Ruby movement is electronically time tested for accuracy. A smart, thin timepiece of functional beauty. The pride of every owner. **SAVE $50.00—ORDER YOURS DIRECT!** Recent list price 79.95. Now reduced for quick sales to **29.95. tax paid** . . . while supply lasts. Featured in Esquire and leading magazines. Instructions and gift case included. Price subject to change without notice because of international crisis. Remit **29.95.** or order C. O. D. plus postage.

THORESEN DIRECT SALES, Dept. 7A-233
131 West 33rd Street. (Phone LA 4-5996 & 7) New York 1, N. Y.

UNLIMITED *Service Guarantee* Exclusive of Parts

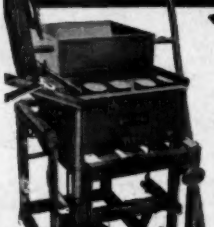
FREE repair service ANYTIME if needed by skilled watchmakers. NO COST EVER for labor, "handling" or adjustment, provided watch is returned with all parts. FREE: Annual oiling, Cleaning & timing service. Thoresen makes lifetime friends!

Buy Direct

Make 100% to 150% Profit!

MANUFACTURE BUILDING BLOCKS

In Your Own Back Yard



AMAZING GENERAL

BLOCK MACHINE

CAPACITY 1000 BLOCKS PER DAY

Only $218 LESS MOTOR F.O.B. PLANT

SHIPPING WEIGHT 425 lbs.

Here is an outstanding opportunity for men of vision and small capital. Cinder and concrete blocks are in great demand. Millions used for homes, factories, public buildings. Sell all you produce at 100% to 150% mark-up.

PEAK BUILDING DEMAND!

The General Block Machine is amazingly practical, foolproof. Simple to operate indoors or outdoors. Rugged all steel construction. Vibrator mounted in sealed ball bearings. Produces up to 1,000 blocks per day. Superior 3 Core Type that meets all building code requirements. Can produce 4 x 8 x 16, 8 x 8 x 16, 12 x 8 x 16 blocks. All materials obtainable anywhere. All operating instructions and mixing formulas supplied. Full details FREE without obligation.

HOW TO BUILD YOUR OWN CONCRETE BLOCK HOME Only 1 Prepaid

Wonderful Book Written & Illustrated by Experts

GENERAL ENGINES CO.

DEPT. S-16 • 307 HUNTER ST. • GLOUCESTER, N. J.

Includes floor plans for 6 beautiful, easy to build concrete block bungalows. Shows ways to save money. How to lay blocks, lay out building lines, mix concrete, build steps, porches and concrete floors. Mail coupon at once with $1.

Name.....

Address.....

City:.....Zone.....State.....

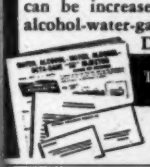
BURN WATER

OR ALCOHOL OR BOTH

IN YOUR CAR!

FOR ALL CARS, TRUCKS & TRACTORS

The gasoline mileage of new high compression automobile engines can be increased up to 30% with alcohol-water-gasoline fuels. (Say U.S. Agricultural Department scientists.)



WRITE FOR FREE LITERATURE

Illustrated — Interesting — Descriptive

YOU'LL BE GLAD YOU DID

NATIONAL AUTOMOTIVE RESEARCH CORPORATION, Dept. OG-1

Venice, California

MODEL BUILDERS!

NEW 1951 CATALOG

MODEL AIRPLANE ENGINES • GLOW PLUGS • MARINE ENGINES • FUELS

MODEL RACERS • ACCESSORIES

CUT OUT AND MAIL TODAY

OHLSSON & RICE, INC.
3340 Emery St.,
Los Angeles 23, California

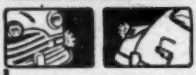
Please RUSH.....copies of the NEW 1951 O&R Catalog at 15c each for which I am enclosing.....in stamps or coins to cover handling and mailing.

Name.....

Address.....

City.....Zone.....State.....

FLASH Your Turns



ELIMINATE HAND SIGNALLING

S & L DIRECTIONAL SWITCH

The lowest priced Directional Switch that meets all S.A.E. requirements.

Here is a safe, comfortable way of signalling your intention to make a left or right turn. Flashes from 60 to 80 times per minute. No need to roll down window to signal turns in cold winter weather.

Kits furnished with all necessary material for perfect installation. No outside mounting of any kind. Uses your present parking and tail lights. Either of our two models fits most cars from 1942 to 1950.

Specify year and make of car. Money-back guarantee.

A Perfect Gift for Motorists

$5.95 postpaid in U.S.A. Send check or Money Order. Postage extra on C.O.D.'s

S & L AUTO SALES

Box 6414, Dept. C, Chicago 7, Ill.

ELECTRIFY your SEWING MACHINE

NEW LOW PRICE!

$11.50 1 YR. GUARANTEE

Buy direct from manufacturer and save! Kit comes fully wired, installed in a jiffy. Fits all machines! You get these *all-new* parts!

- Motor & Bracket
- AC-DC 115v 60c
- Multi-speed foot control
- Cord set & block
- Easy instructions
- Steel pulley & belt

FREE, reg. $2.95 Chrome SEWLITE given with kit.

10 DAY FREE TRIAL—ORDER NOW!

Send no money, pay C.O.D. or send money order and we'll pay postage. Please state whether wheel on your machine turns toward you or away from you. Shipping wt. 6 lbs.

CONTINENTAL SALES CO.

1046 Bedford Avenue Dept. PS-22 Brooklyn 5, N.Y.

4 easy steps to extra MONEY

Here's quick spare-time cash. 1. Send for fast selling Friendship All-Occasion Greeting Card Assortments ON APPROVAL. 2. Show samples to friends. 3. Take orders. 4. Collect profits! No experience needed. Folks you know buy these gorgeous values on sight. You make 50c profit on $1 box of 21 All-Occasion cards. Many others. EXTRA CASH BONUS. Write for details and samples ON APPROVAL today.

FRIENDSHIP STUDIOS, Inc., 413 Adams St., Elmira, N. Y.

TREASURE -- $10,000

New locator detects metals, valuable minerals and buried treasure. Money-back guarantee of superiority.

Also geiger counters. Govt. reward of $10,000 for uranium discovery. Write for FREE information.

THE GOLDAK COMPANY

1544 W. GLENOAKS BLVD., GLENDALE 1, CALIF.

PLYWOOD BOAT KITS

$97.00 (Freight Included)

Build this 13-ft. sport run-about from ready-cut parts. Kits include all hardware, paint, etc., to complete the boat shown. Send for free folders of all models as low as $32.00 *freight included.*

TAFT MARINE WOODCRAFT

Dept. S. 636 39th Ave., N. E., Minneapolis 21, Minn.

MONTH AFTER MONTH, YEAR AFTER YEAR, YOU SEE OUR AD.
REMEMBER IT'S DANGEROUS to pay less if you want the finest matched USED tires.

GOODYEAR Firestone

GOODRICH, UNITED STATES, GENERAL, & OTHERS, NOT RECAPS

Our policy is to select your tires so carefully, as if our very future depended on the service given by that particular tire.

FREE TUBE WITH "ALL" BLATT'S GOOD GRADE TIRES

GOOD GRADE, 16 MONTHS GOLDEN RULE GUARANTEE BOND.

600-16	$4.18	700-15	$4.58	650-20	$7.98	32x6 (8)	$8.68
650-16	4.68	670-15	4.78	700-20	8.58	32x6 (10)	9.98
700-16	5.08	710-15	4.98	750-20	8.68	900-20	13.98
650-15	4.48	550-17	4.68	825-20	13.98	1000-20	13.98

FINEST GRADE, 26 MONTHS GOLDEN RULE GUARANTEE BOND
THIS GRADE MADE THE BLATT NAME "WORLD FAMOUS."

MATCHED BALANCED TIRES				MATCHED BALANCED TRUCK TIRES			
600-16	$5.38	650-15	$5.98	600-20	$9.98	900-20	$17.58
650-16	5.98	670-15	6.28	650-20	9.98	1000-20	18.58
700-16	5.98	700-15	6.58	700-20	10.98	1100-20	18.58
750-16	6.98	710-15	6.38	32x6 (8)	10.58	1000-22	17.58
550-17	5.98	760-15	6.58	32x6 (10)	11.98	1100-22	18.58
525-18	5.58	820-15	7.08	750-20	12.58	1200-22	22.58
650-18	6.98	475-19	5.98	825-20	16.58	1100-24	21.58

Military Reg. Guar. 16 mos. (Super-hy 45,000 miles)

750-16		900-16		750-20	
Reg. X-Tra Traction	$9.98	Reg. X-Tra Traction	$9.68	Reg. X-Tra Traction	$10.48
	14.48		13.48		16.68

FACTORY REBUILT SNOW-TREB TIRES. 24 MO. GUAR.
NEWTRACTION TREAD—PERFECT CASINGS

670-15	760-15	650-15	600-16	700-16	550-17	$9.98
710-15	820-15	700-15	650-16	550-17		

BLATT BLATT BLDG., GIRARD & LANCASTER AVES., DEPT. PS, PHILADELPHIA 31, PA.

Send check or money order and this ad for rush shipment. We won't ship a tire we wouldn't use. The name to trust in rubber. Shipments RUSHED Down South, Up North and Far West

---

SPARE TIME at home
$ SEWING MACHINE BUSINESS $

Hang Out Your Shingle

Write your own pay check. You profit from my 19 years experience.

EASY —Hundreds of our men making **big money.** I show you how to Repair, Rebuild, Electrify, Trade, Rent and Sell at big profits. Motor Kits, New Machines, and Supplies wholesale. FREE details.

TAYLOR SERVICE CO., Hamilton PS-1, Ohio

Reduce RADIO NOISES

SIMPLY PLUG Radio or Appliance cord into Noise Eliminator and plug into wall socket. Enjoy reception FREE from many distracting noises. Send No Money, pay postman $1.25 each (2 for $2.25) plus postage or send cash and we'll mail postpaid. Try 5 days, money back if not delighted. Many hundreds of satisfied users. Send for yours today.

$1.25 ea. 2 for $2.25

MERIT SALES, Dept. N-29
6560 Sheridan Rd. Chicago 26, Ill.

ITALIAN ACCORDIONS

All types, all models, Very best. Hand Made. Fully guaranteed. Buy direct from Factory representative at lowest wholesale prices, and Save Money. Also Button Accordions, Chromatic Accordions and Concertinas. We take any instruments in trade. Send name and Address for FREE catalog.

ITALIAN ACCORDION MFG. CO.
7600 Cottage Grove Ave., Dept. PS-1, Chicago 19, Ill.

If Ruptured

Do What Others Now Do—
Wear a Form Fitting MILLER Truss

which provides natural freedom and comfort in working, playing, walking, dancing, horse back riding, swimming, when sleeping, etc. You just cannot afford to be without this protection and convenience.

Wear the **MILLER** Truss and consult your physician before deciding to keep it.

Write me today for **FREE** descriptive circular. Sent in a plain, sealed envelope.

FRED B. MILLER Manufacturer
Dept. P.S., Hagerstown, Maryland.

PLASTICAST

THE GREATEST THING IN PLASTICS!

A NEW HOME INDUSTRY AND HOBBY!

We have started **THOUSANDS** of people in a wonderful new kind of business! Here are 4 reasons why: (1) The work is pleasant and very easy . . . *actually as easy as pouring water out of a glass!* (2) **VERY LITTLE** investment is required; imagine, less than $5.00 is required in order to start you off in your own manufacturing business! (3) Can be started **ANY WHERE** . . . at home, garage, basement, etc. and most important (4) The things you can make in **QUANTITY PRODUCTION** are not only exceptionally attractive and useful but are always in big demand *every season of the year!* **VAST QUANTITIES OF PLASTIC COMPONENTS NOW NEEDED BY ARMED SERVICES.**

YOU CAN MAKE ANYTHING!

What is this new business? It is **CASTING** . . . Casting with liquid plastics. **CASTING** is a method of production manufacturing **WITHOUT MACHINERY OR TOOLS! CASTING** is the exceedingly simple process of pouring liquids into molds . . . It is as simple as that! Like making Jello, only these liquid plastics **SOLIDIFY** in a few minutes after mixing into extremely HARD, DURABLE and ATTRACTIVE articles such as Jewelry, Novelties, Giftware, Figurines, Statuary, Knick-knacks, Baby Shoes, Souvenirs, Ceramics, Imitation Marble, Bookends, Lamps, Pen sets, Cigarette Lighters, Toys, Dolls, Banks, Fishing Lures, Tools . . . **A THOUSAND USEFUL THINGS!** The field is really unlimited. We supply EVERYTHING . . . Casting Materials, Molds, Accessories and Instructions.

1000 GOLDEN OPPORTUNITIES!

Regardless what you are doing now you can get into the CASTING BUSINESS in your spare time or evenings. We assure you, once you do, you will be eagerly devoting all of your time to this very easy, fascinating and **HIGHLY PROFITABLE OCCUPATION** until it leads into a dependable business all your own! **BUT LET US PROVE IT.** Send only 25c for our big 40 page Catalog of Casting Materials, hundreds of Molds, etc. We will also send you **FREE** an attractive **CASTING** to show you what can be done with liquid plastics in a few minutes! We will also send you FREE a valuable book giving you details on the **ART AND BUSINESS OF CASTING** which shows you how to cast and get started! All this for only 25c, but write for it today. *This may be the lucky coin that will start the most fascinating and profitable phase of your life!*

COMPLETE OUTFIT—Only $3.50

If you want to get started at once send for our big **SENIOR PLASTICAST OUTFIT** consisting of **TEN VALUABLE METAL MOLDS** for making extremely beautiful useful TRANSPARENT crystal-clear or colorful plastic articles of real value! Make unusual Penholders, Cigarette Lighters, Ashtrays, Pendant Hearts, Souvenirs, Imbed Flowers and Photos, Brooches, Key-Chain Fobs, Paperweights and countless attractive items! Pipette, Measure, Imbedding and Polishing Materials, 2 dyes, Instructions and quart of **PLASTICAST** and hardener for about $100 worth of castings! **COMPLETE OUTFIT**, ppd. $7.50
MASTER OUTFIT, 4 molds, pt. **PLASTICAST**, etc. . . . . ppd. $3.50

FREE

PLASTICAST CO. (Dept. A)

170 N. Halsted St. Chicago 6, Ill. (Write to nearest address) P. O. Box 987 Palo Alto, Calif.

CANADIAN CUSTOMERS, please order directly from: CANADIAN INDUSTRIAL PLASTICS, LTD., 1066½ Pender West, Vancouver, B.C.

OPPORTUNITIES AHEAD!
TRAIN FOR A FUTURE IN

DIESEL

Prepare for the big earning power of Diesel Trained Men. Start learning at home, in spare time. UEI's easy, practical training covers all phases of DIESEL engine operation, fuel systems, auxiliary equipment, repairs and maintenance. Also new Scientific Auto Motor Tune-up. After home course, you come to Chicago for actual practice in UEI's modern shop under experienced instructors. GET ALL THE FACTS FREE. WRITE TODAY!

DIESEL DIVISION **UTILITIES ENGINEERING INSTITUTE**
2525 Sheffield Avenue, Dept. DM-8 Chicago 14, Illinois

Now! YOU CAN MAKE MONEY . . .

TURNING WORTHLESS OBJECTS INTO GOLDEN TREASURES—

. . . *BY METALIZING!*

HERE ARE JUST A FEW OF THE HUNDREDS OF ARTICLES THAT CAN BE RESTORED BY REPLATING—INCREASED IN VALUE—OR "ETERNALIZED" AS KEEPSAKES WITH A COATING OF EVERLASTING BRONZE, STERLING SILVER, OR 14 KARAT GOLD.

Costume Jewelry from flowers, insects, shells, and leaves.

Ash trays, paper weights, from leaves, fruit, vegetables.

Metalize busts, figure, from plaster cast or wood carvings.

Metal plate object of glass, cloth, leather, plastic or rubber.

Eternalize Baby Shoes, Toys, and other sentimental mementoes.

Metalize baskets, plates, ceramics and other non-metallic objects.

Preserve sports and war trophies in solid Bronze, Silver or Gold.

YES—ANY MAN OR WOMAN CAN DO WORK LIKE THIS IN ONE CORNER OF THE KITCHEN OR IN ANY SPARE ROOM!

Make $5.00 An Hour For Your Spare Time!

Amazing book tells you how

HOW to do the work—how to get customers coming to you—how to set up the simple equipment — how and where to buy the materials—what to charge — how to start in spare time—how to expand into a full time business whenever you wish. Shows you in pictures and words how to put a coating of pure metal on such things as flowers, leaves, insects, shells, wood carvings, plaster castings, busts, statues, religious figures, buttons, baskets, feathers, base balls, golf balls, mementoes of all kinds, such as, baby shoes, party and wedding favors and decorations. Operating a home metalizing business is one of the greatest insurance policies a man could ask for his future. Read about it without risking a penny.

OWN YOUR OWN HOME-OPERATED BUSINESS

Think of turning 56 cents worth of materials into a profit of $5.00 and over for just a few minutes of easily learned handiwork. Sounds fantastic? . . . Yet it is absolutely true . . . AS YOU CAN QUICKLY PROVE TO YOURSELF.

AN EXCITING NEW OPPORTUNITY

Just at a time when hundreds of men and women would like to make an extra $35.00 to $50.00 a week in spare time home work, the old—established—and highly profitable Metalizing Business has been turned into a home-work money-maker. Where in the past a few big companies have been making fortunes, now hundreds of smaller home operators can become independent. I have ready to send you a complete set of simple instructions by which anyone — regardless of age or education — can learn the fascinating art of metalizing. By this process you can replate worn objects in silver, copper, or real gold—you can change silver to gold by overplating—you can even deposit a heavy coating of solid metal on non-metallic objects such as baby shoes, golf balls, toys and other precious keepsakes—or you can take inexpensive articles and make them worth 10 to 20 times their cost by jewel plating with precious metals.

ALL THIS INFORMATION IS FREE

The information is free. A stamp brings you the details of the exact plan by which hundreds are NOW MAKING EXTRA MONEY EVERY WEEK. Study it over. Analyze the possibilities. Then if you don't think it's made to order for you —your only loss is your 3c stamp. You can read every fact, every secret, every step of the instructions—all at my risk.

NO "CATCH" TO THIS OFFER DON'T SEND ME A PENNY . . . *Just Your Name!*

Learn about this wonderful "Ace in the hole". See how you can start without risking job or pay check — how you can turn spare hours into $5.00 bills — how you can actually have fun making money in a business that all the family can help with. No charge now or at any time for the complete facts about this permanent lifetime business that has now opened its door to home operation. Scores of men and women have already started . . . Plenty of opportunity for hundreds more. BUT DON'T PUT IT OFF. Send your name and address TODAY . . . It may open new horizons in your life.

R. E. Brandell, Warner Electric Co., 1512 Jarvis, Dept. 21, Chicago 26, Ill.

R. E. Brandell, Warner Electric Co.
1512 Jarvis, Dept. 21, Chicago 26, Ill.

Rush complete facts showing how the old and profitable Metalizing Business has now been converted into a home work money-maker for full or spare time. No charge or obligation for the information you send.

Name _____

Address _____

City _____ *Zone* ____ *State* _____

Classified Ads only 50c per word per insertion, payable in advance. Minimum ad 10 words. To be included in March issue, copy should be in our office by January 24th.

CLASSIFIED OPPORTUNITIES

POPULAR SCIENCE MONTHLY-351 FOURTH AVE.-NEW YORK CITY 10

1 AUTOMOBILES

"SPEED & Mileage"—World's #1 Power Manual! Championship methods, all cars . . . shows Speed tuning, "Souping", Racing Tricks, "Customizing". 100 gas saving secrets! "Double your power, gas mileage, acceleration!" Covers Racers, Modified Stock, California Roadsters, Sports Car Construction—Engine Rebuilding, Frames, Bodies, Fuels, Formulas, Ratios, "Speed Shop Methods". How to Build Superchargers, Dual Manifolds, High Compression, Racing Cams, Dual Mufflers, Water Injectors, Economizers! Photo-section on "California Custom Cars" Body Restyling, Streamlining, Sports Conversions! Working Plans! 320 Illustrations! "Guaranteed Manual" plus Speed Equipment Catalog plus "California Hot Rod Handbook"—Three books $1.98, (C.O.D.'s Accepted). Almquist Engineering, Milford 12Z, Pa.

FOR free descriptive literature on alcohol-water injection for cars—trucks—tractors write Shade, Webster, New York.

SILENCE Overhead-valves, Attachments unnecessary, $2.00. Derderian, Box 542, Sandston, Virginia.

"WATER Injection." Also-Speed-Power-Economy-Methods! Free illustrated information. Neher Industries, La Verne 6, Calif.

R-A-C-I-N-G Equipment from California—Speed-Dress-Up Accessories for e-v-e-r-y make passenger automobile. Also, Racing Ignitions, Carburetors, Flywheels, Camshafts, Water Injectors, Mufflers, Crash Helmets, Jet Engines—Thousands of items in stock! Dual Manifolds (for "Jeeps" to "Rockets")—Finned Hi-Compression Heads—covering 155 makes—models. Big "1951 Illustrated Catalogue"—plus, "Driving Economy" — 25c. (Dealers, request Wholesale Catalogue.) Newhouse Automotive Industries, 5805-A7 East Beverly, Los Angeles 22.

"SPEED and Power" Handbook—128 enameled pages! Covers all makes of cars! Fifty Breathtaking Chapters . . . Including "Jet Propulsion" — "Racing Frames" — "Wheel Geometry" — "Dynamometers" — "Reciprocating Masses" — "Gear Ratios" — "Dual Pipes" — "Fuel Formulas" — "Porting" — "Balancing" — "Lowering" — "Relieving". Authentic—direct from California! Shows exactly how to build your own Dual Manifolds, Superchargers, Hot Cams, Water Injectors, Hi-Compression Heads, Mileage Devices! Save—Save! Get up to ten more miles per gallon—racing speed, lightning acceleration. Get dynamic power increases from any passenger automobile! Build fast Stock Cars, California Roadsters, 160 M.P.H. Rods! Includes construction drawings! Tuning Techniques! Speed Tricks! Economy secrets! Ingenious formulas! Plus "California Customizing"—Photographs, Diagrams, (Newest ideas.) Conversions, (Re-styling all makes.) Also, big "Speed Equipment Picture-Catalogue." Plus "Alcohol Injection." Plus—36 page "Economy Handbook." 300 Illustrations. Five items—$1.98 postpaid. Newhouse Automotive Industries, 5805-A 2 East Beverly, Los Angeles 22. (See page 54)

SEE our ad under Motorcycles for Midget car bargains. Midget Motors Directory, Athens, Ohio.

FORD owners! Safe-T-Scope driving light turns with steering. Fits 1949, 1950 grill. $29.50 value. $12.95 postpaid. Darbee, 35-A Fare, Clawson, Michigan.

AUTOMOBILE History Scrapbook #1 just published! Over 250 ads and illustrations of antique and vintage automobiles dating back to 1901. Money-back guarantee, $1.50. Wiglesworth-Chasteen, 7134-PS1 Alhambra, Mission, Kansas.

CALIFORNIA Custom accessory headquarters. Buy direct from original designers and save. Chrome dash panels, solid hood sides, grille panels, speed equipment, dual pipes, push button door conversions, chrome motor accessories, fender skirts. New 1951 catalog, 40 pages, hundreds of photos—25c. Eastern Auto, 3319D South Grand, Los Angeles 7, Calif.

MODERN Motor Car Magazine—Facts, Figures, Photographs and Features on all cars. Sample Copy 25c: $3.00 yearly. Crestline Publications, Box 581-B, Holliston, Mass.

MOTORISTS—Stop Wasting Gas! New automatic vaporizer injects water vapors into combustion chambers. Fits all cars. List make, year and no. cylinders. Only $5.95 postpaid—Send cash or money order. Literature Sent Free. Vaporizer Company, Box 7033, Station G, Los Angeles, Calif.

ARTHRITIS! Eradicated forever! See Personal Column. Guarantee refund Never requested.

RACING Fuel Formulas, Fuel secrets, all about Methanol, Alcohol, Benzol, Toluene, Ether, Xylene, Doping gasoline, etc., for Hot Rods, Motorcycles, Sport Cars, Midgets and Indianapolis Cars. Special Carburetors, Ignition systems, Gas savers, Water injectors, and Over-drive Conversions. Price $1.00. White & Langnecker, 2502 Twelfth Avenue, Beaver Falls, Penna.

BETTER performance with Equa-Flo. Automotive Research, 3809 Flint, Lubbock, Texas.

PHOTOGRAPHS, World's Finest Automobiles. List, Sample 25c, Box 1028, Minneapolis, Minnesota.

AUTO-Shocks—Fun Galore. Harmless effective electric shock to anyone touching car exterior. Lasts Years. Complete with switch, parts, and instructions. Easily installed. $7.00 Postpaid. Morbarco, 192 Arlington Street, Lawrence, Mass.

BIGGEST "Racing & Hot Rod Catalog" in world—just out! Factory Discounts. Hollywood Mufflers $4.50, Duals $15.90. Chrome Megaphones $1.55, Dual Manifolds $9.95, Racing Cams $29., Heads $23.50, Water Injectors $12.95, Superchargers. Bargains! (Free "Power Calculator" included). Postpaid 25c coin or stamps. Almquist Engineering, Milford 14Z, Pennsylvania. (Dealers Wanted.)

2 AUTO SUPPLIES & EQUIPMENT

NEW and used guaranteed parts for civilian and Army cars and trucks. Largest stock in America. Mail orders. Pioneer Auto Wrecking Company, 788 W. 13th Avenue, Denver, Colorado.

FROM Speedway to Roadway! Trackproved hi-speed heads, manifolds now available for any passenger car! No special tools needed! Increase horsepower 25%! Astounding getaway! Free illustrated catalog. Speedsport, 6215-F Diversey, Chicago 39.

SEND for free Life Membership card.—"Water Burners" of America, La Verne, California.

BRUSH Plating Outfits connect to a battery. No tanks or shop required. Free particulars. Gunmetal Co., Avenue K, Decatur, Illinois.

CARBURETOR Adaptors install larger or smaller carburetor on your motor. Dealers wanted. Write; Gotha Automotive Specialists, P.O. Box 141, Harvey, Illinois.

YOUR car burn oil? Poor compression? Slow starting? Excessive cylinder wear? Holt's Piston Seal restores compression! Cuts oil consumption! Checks piston slap! Lasts 10,000 miles! This amazing British product, now available, forms self-expanding pliable lubricating seal around pistons. Compensates for wear! Cannot harm finest engine. Easily installed; full directions enclosed. $4.95 tube for 6 or 8 cylinders up to 240 cubic inches. Details free. Treglown Company, 200 West 7th Street, Plainfield 16, New Jersey.

CHEVROLET Parts, Scarce motor, body, sheet metal parts. Grossman Chevrolet, Minneapolis, Minnesota.

AUTOMOBILE Side-Window Wiper $1.00 Postpaid. Park Sales, P. O. Box 73, Forest Park, Illinois.

CONVERTIBLE Top covers, Plastic fabric. Tailored, $24.00. Vassar, Cleveland 5, Ohio.

ANTI-Rattle, Auto Windows (Except Convertibles) Easily Installed—Most Effective! 4 Units, 25c. Rolexco—Box 11—Orange, N. J.

PISTONS and Rings, All Cars any Make or year. Merryman Company, Lawndale, California.

3 AUTO TRAILERS

BUILD your own trailer! Plans for all kinds. Illustrated catalog 10c. Jim Dandy, 125-S, Wausau, Wisconsin.

4 MOTORCYCLES BICYCLES, SUPPLIES

WHIZZER (all attachments) $25; Cushman motorscooter, extra tires, $20; Indian motorcycle $30 complete; Midget car $35. Rush 25c (35c first class mail) for catalog #947 listing these and scores of other amazing bargains in motors, midget cars, motorscooters, motorbikes, motorcycles, etc. Associated, Box 1764-CS, Toledo, Ohio.

RECONDITIONED motorcycles and motors. Chromium accessories. Complete stock Indian parts. Expert rebuilding. Fast service. Indian Motorcycle Sales, Kansas City 1, Mo.

MIDGET racer, less motor $10; 1946 Whizzer $15; 1938 Cushman $35; James motorcycle $45; Indian $30; Smith motorwheel $8; Motorbike conversions $5; 2 h.p. engine $5. Four balloon tires $3 (Mailorder only). Send 25c for catalogue Number Thirty-Nine just out listing these and hundreds of other bargains, in new and used machines, parts, plans, War Surplus, etc. (35c by First Class Mail). Midget Motors Directory, Athens, Ohio.

MOTORCYCLE Magazine — Worldwide Coverage, Yearly Subscription $2.00. Sample 20c. Motorcycle News, 5424-B Sawyer, Chicago 25.

MOTORCYCLE camping trailer. Unfolds into bed. Plans 25c. Rodney Hanson, Woodville, Wis.

WHIZZER in Schwinn bike $20; good motorscooter (twist grips) $22.50; midget racer $40; Shaw bicycle motor $15. Send 25c (35c first class mail) for catalog #17 jammed with other sensational bargains in wheels, motors, clutches, motorscooters, midget cars, motorettes, motorbikes, etc. Gall, 538 Erie, Toledo, Ohio.

REBUILT Gasoline Engines $9.00 to $30.00. Cauffiel Motor Industries, Temperance, Michigan.

5 AVIATION

PROPELLERS—For Sleds, boats. Literature, Standard Aerocraft, Box 387, Ft. Worth, Texas.

PROPELLERS, plans, supplies, for ice sleds, snow sleighs, air boats. Catalog 20c. Banks-Maxwell, Box 3301G, Ft. Worth, Texas.

BULLET Racepiane-Homebuilt Speedy Monoplane Blueprints $2.00. Corbcraft, 80-S Maxwell, Rochester 11, N. Y.

7 ELECTRICAL SUPPLIES & EQUIPMENT

2% TO 20% Discount on Radios, Electric appliances, Mixers. Catalog $1.00—(Refundable) Points' Mail Order House—Box 331, Middletown, Pa.

LAMP Parts—Sockets, wire, harps, cords, bases, pipes—all parts to build and repair. 64 page catalog with charts and instructions 25c. Gyro Lamps, 5402B Clark, Chicago 40.

WE make low cost forced circulation electric industrial ovens. 1001 uses; 10 cubic feet, 110 volts. Fully guaranteed. Write Dept. PS, Grieve-Hendry Co., 1101 Paulina, Chicago.

LAMPS—Build own Originals. Parts Wholesale, any amounts. Catalogue 10c. Brown Lamp Co., No. 501, Wellston, St. Louis 12, Mo.

FREE—Send for New Catalog. Bargains in Welders, Motors, Generators, Surplus Equipment. Or, Build Your Own Kits—Save. LeJay Company, Minneapolis, Minn.

8 WELDING, SOLDERING, PLATING

SOLDER Aluminum, iron, copper, tin, brass, with Plymouth Flux. Send $1.25 per oz. Plymouth Sales, Box 1288, San Francisco, California.

200 AMP welding generators. Brand new. $25.00. Free literature. Thorndyke Mfg. Co., Pipestone, Minn.

RADIATOR Repairing Books, Supplies, Equipment, Gasoline Torch. Write for circular. Curfman Mfg. Co., Maryville, Mo.

ELECTROPLATING Salts and Rectifiers, Mirror Resilvering and Chipped Glass Nameplate Supplies. John Sprinkle, V95, Marion, Indiana.

BUILD Your Own portable arc welder. Hobart Generator plus your auto engine. Saves hundreds, gets big paying jobs. Catalog Free. Hobart Welders, Box P-112, Troy, Ohio.

9 AIR CONDITIONING & HEATING

NEW Valve Invention lowers heating costs, makes cold radiators Hot. Guaranteed. Free Booklet. Radiator Valve Co., Dept. J, Philadelphia 43, Pennsylvania.

10 MACHINERY, TOOLS, SUPPLIES

POWER Tools. Build your own with Lewis Casting. Save up to 80%. Complete castings, material and blueprints supplied for 23 woodworking and metalworking tools. 32 page Catalog 10c. Write today. Lewis Machine Tool Co., 3217 Union Pacific Avenue, Dept. S, Los Angeles, Calif.

DRILL Grinder for twist drills. $2.95. See ad on page 250.

POWER tools, equipment wholesale prices. Free Bulletin. Homecrafters Cooperative, Grand Rapids 6, Michigan.

NEW handy Rivet-Kraft Kit. Lloyd's Craftlines. See Page 62.

13 BATTERIES, GENERATORS, ETC.

EDISON Nickel Batteries. Foolproof. Odorless. Low Prices. Sizes 37 to 600 Ampere Hour. Interesting Literature. Hawley Smith Co., Croton Falls 2, New York.

BATTERY Life can be doubled with Battery Aid. Proved by a million. Power is increased and life doubled in new batteries. Results proportionate in older batteries. Guarantee, $1.00 postpaid. Hayden Institute, Saint Helena, California.

14 BOATS, OUTBOARD MOTORS, ETC.

FASTEST Boats In The World—Build Now. Complete plans available for sleek Three Point Racing Hydroplanes, Runabout and others. Send 25c now for new illustrated catalogue. Champion Boats, Box 7006-K-1, Long Beach, California.

STEERING Wheels, windshield brackets, from $6.95. Modern fittings "Water Skis," at lowest prices. Complete pre-cut plywood boats. Bargains galore. Folder 10c. Marine, Box 681, Mendota, Minnesota.

FULL size, cut to shape boat patterns, blueprints, 7½-38 feet. Illustrated "Build a Boat" catalog, 25c (coin). "How to Build Boats" book $1.00. PolyWog Houseboat Plans $10. Marine Catalog $1.00. Cleveland Boat Blueprint Co., Dept. A-77, Cleveland 13, Ohio.

AUTO Conversions and Parts, Marine manifolds for all engines. Your transmission converted to marine gear, propellers, shafts, struts couplings, etc. Everything you need for your boat. Money back guarantee. Conversion Parts Company, 277 Adams Street, Boston 22, Massachusetts.

SAVE 2/3 cost. Assemble your own boat. We furnish parts. No experience necessary. Rowboats, Cruisers. Illustrated Catalog 25c. Midwest Boat Company, Menomonee Falls 1, Wisconsin.

NEW, used, rebuilt marine motors. Marine conversions, fittings. Free Catalog. Stokes Marine Supply, Dept. 23, Coldwater, Mich.

TWIN Tank Boat Plans $1.00. P-38 Tanks $9.95. Free Picture. Twin Tank, Box 89 Merced, Calif.

EXPRESS Cruiser or Open Utility, 20' Prefabricated, Mahogany, oak, bronze, 15 to 40 mph. Easy terms! Complete illustrated information 25c, refundable. Bay City Boats, Inc., Bay City 101, Michigan.

BOAT Kits, marine hardware, fittings, accessories, etc. Catalog 10c. Minnesota Marine, 3207 Fremont South, Minneapolis 8, Minnesota.

MARINE conversions for Ford and Jeep engines. Catalog 10c. Lehman Manufacturing Company, Department A, Newark 2, N. J.

BOAT Trailer Winches, Brass or Iron. 1636 Bonnie Brae, Houston 6, Texas.

15 ENGINES, MOTORS, ETC.

WINDING Data, listing 225 motors single and three phase. $1.00. Motor Data, Box 7631, Kansas City 3, Mo.

1 HP gasoline engines "flyweight" complete, new $23, re-conditioned $17. (November advertisement Page 92). Foster Sales, 202 Laurelton, Springfield, Mass.

MOTOR Winders, free bulletins. Winding and testing equipment. Motor Industries, Quincy, Illinois.

MOTORS ½ horse $15. ¾ $22. 1 $35. Compressors $17.50. Other bargains. State your needs. Butler, 1885 Milwaukee, Chicago 47.

REBUILT Gasoline Engines $9.00 to $30.00. Cauffiel Motor Industries, Temperance, Michigan.

HOTTEST surplus list in the country. Electronics, Hydraulics, Aircraft, Gadgets. Dick Rose, Everett, Washington.

16 AMERICAN POLICE JIU JITSU

DEADLY Judo—Fiercest fighting technique. Trick knockouts. (Over 200 illustrated pictures.) Expert instructions—Three volumes Complete $2.25. Variety House, Box 46-A Wall Station, New York 5.

18 BODY-BUILDING COURSES

TALLER. Be one to three inches taller. A new scientific method for permanent height increase has now been developed. Free Information. Natural Methods, Box 453-S Briggs, Los Angeles.

BARBELLS, Dumbbells, Exercise equipment, Courses. Free booklet. Good Barbell Co., Reading, Penna.

19 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY

190 PROFUSELY illustrated pages antique and modern pistols, swords, daggers, armor, etc. 50c. Robert Abels, PS460 Lexington Ave., New York 21.

ANTIQUE, modern guns. Bargain list 10c. Martin Rywell, Harriman, Tenn.

5,000 BARGAINS, firearms, binoculars, war relics, catalog 40c. Smith Museum, Runnemede, N. J.

MOLDS "For fishermen, sinker, squids, jigs, and lures" handled and hinged, quality fishing tackle, free catalogue. Sweets Molds, Tonawanda, New York, Box 163.

NEW! Free Catalog. Complete, easy-to-build Glass Rod Kits, other fine fishing tackle values. Valuable free offer. Write today. Trimline Tackle Co., Dept. S, 506 Tinton Avenue, New York City 55.

GUNS! Nothing But Guns! If you are interested in rifle, pistol or shotgun shooting; modern and antique firearms; ammunition reloading and gun remodeling—send 6c in stamps for sample copy 96-page 35c monthly magazine The American Rifleman, exclusively about guns and shooting! National Rifle Association, 1609-H Rhode Island Ave., Washington 6, D. C.

HOME Turkish Bath, portable, collapsible, inexpensive. Free information. Perspirator, 1186-W East 180th St., N. Y. 60.

SEND 10c for list, either rifles, shotguns, handguns or send 25c for all lists. Frayseth's, Wilmar, Minnesota.

OVER 500 guns, modern, obsolete. List 10c coin. Ed Howe, 26 Main, Coopers Mills, Maine.

LEARN Gunsmithing! Details, copy Guns and Gunsmithing, plus copy 50 page Gun Catalog, 25c. Gunsmith, Palatine, Ill.

CAST Iron Molds—for making your own sinkers. Write for free illustrated booklet. Reading Instrument Co., Box 78, Reading, Pennsylvania.

20 FIELD GLASSES, TELESCOPES, ETC.

"FREE" Catalogue! Thousand war surplus optical bargains. Lenses, Prisms, Telescopes, Binoculars, etc. Send $1.00 for 10 Lens Hobbyist Set and Project booklet. G. Jaegers, 93-08—95th Avenue, Ozone Park 16, N. Y.

BRAND New, imported 6x30 precision binoculars $32.00. Others amazingly priced. Folder. "Binocular Selecting" pricelist free. Prentiss Importers, 227 Mercury Building, West Los Angeles, Calif.

GIANT, 100 power astronomical telescope with 6 ft. tripod (10,000 area magnification) Clear Vision, full power guaranteed, $15.00 F. O. B. factory. Suffolk Science Service, Dept. TC, Riverhead, N. Y.

TELESCOPES, Binoculars, Microscopes—big bargain catalog free. Brownscope Company, 24 West 45th Street, New York.

WAR Surplus Bargains, Binoculars, Telescopes, Sextants. Millions of Lenses, Prisms, Reticles, Eyepieces, Objectives, etc. Mail 10c for Big "Catalog CN." Send $1.00 for Stock CN—10-piece Lens Kit and big Instruction Booklet. Edmund Salvage Co., Barrington, N. J.

BINOCULARS repaired, all makes. Authorized dealer. Hensoldt and Zeiss binoculars, scopes. Tele-Optics, 5514 Lawrence, Chicago 30, Illinois.

REFLECTOR Telescope Kits, Refractors. Free Illustrated Bulletin. Rake Instrument Laboratory, 612 Adams, Hoboken, N. J.

REFLECTING Telescopes, completely assembled, 60X, $25.00. Guaranteed Observatory clearness. Free information. Skyscope, 475 Fifth Avenue, New York 17.

POWERFUL astronomical telescopes easily made. Perfect lenses and instructions: 100x $3.00; 100x and 200x $4.00; 100x, 200x and 400x $6.00. Full power, clear vision guaranteed. Instructions alone 10c. Suffolk Science Service, Riverhead, N.Y.

TELESCOPES—Precision Mirrors, Oculars, Accessories, Microscopes, laboratory equipment, Professional quality, amateur prices. Catalog 5 25c. Ross, 70 W. Broadway, N. Y. C.

ASTRONOMICAL Telescopes, binoculars, microscopes: bought, sold, repaired. Books, lists 1c. Rasmussen-Reece, Amsterdam, N. Y.

SAVE 50% On New Binoculars! Free Catalog. Free book, "How to Select Binoculars." Write today! Bushnell's, 43-P-1 Green, Pasadena 1, California.

24 DOGS, BIRDS, PETS, RABBITS

MAKE Big Money! Raise Chinchilla Rabbits. Cash markets supplied for your production. Write today! Rockhill Ranch, Sellersville 16, Penna.

SEE Golden Hamster ad on Page 60. Shows picture of Hamster.

EARN up to $400 monthly—Raise Angora Rabbits! Experience unnecessary. Wool brings $5 Pound. Plenty markets. Folder Free. White's Rabbitry, Newark 35, Ohio.

NATURALIST'S Catalog 10c. Reptile Bulletin 5c. Chameleon 45c. Turtle 45c. Quivira Specialties, Topeka 10, Kansas.

RAISE Guinea Pigs. Money makers. Booklet free. Taylor's, B426B, Hapeville, Ga.

RAISE pheasants on the $100 week plan. Little capital and space can make you independent. Free details. Great Central Game Management System, Columbus 16A, Kansas.

BRED Mink Booklet Pen Plans 20c. Wettlaufer Mink Ranch, Gravel Road, Webster, New York.

RAISE Mink: Free booklet, pen plans, inside "secrets", feed, care. Mink are money makers. Investigate today. Lawrence Molgard, Brigham City 13, Utah.

HAMSTERS—Money Making Virgin Stock—Equipment. Free illustrated Instructions with Each pair. Free Prices. Dixie Hamstery, 502-D Trinity Lane, Nashville 7, Tenn.

25 FROG RAISING

"RAISE FROGS!" New book tells how! Illustrated Literature Free. Marlboro-B, Box 7002, New Orleans 19, Louisiana.

MAKE money with frogs. Particulars free. Specialties House, Whiting 10, Ind.

30 FARMS, OTHER REAL ESTATE

FLORIDA. Beautiful homesites in new Lake County development. $245 at $10 monthly. Near Ocala National Forest, many pretty lakes, streams, pavement. World's best bass fishing, wonderful hunting. Safe from bombs. Folder free. Winfree Vernor, DeLand, Florida.

BIG Free Winter Catalog! Farm and country real estate bargains, good pictures, many states, easy terms, many equipped, feed included. For Special Service state requirements, desired location. United Farm Agency, 2825-PS Main St., Kansas City 8, Mo.

OZARK Lands for all purposes. Actual river frontages, 5 acres $90.00 and upwards. Free list and literature. Hubbard, 424-H, Minnesota Ave., Kansas City 1, Kan.

GOOD Farms—Ranches, Washington, Minnesota, Montana, Idaho, Oregon, North Dakota. Dependable Crops, favorable climate. Write for literature, lists describing typical farm opportunities. Specify which state. J. W. Haw, 120 Northern Pacific Ry., St. Paul 1, Minnesota.

STROUT'S Catalog—Farms, Homes, Country Businesses, World's Largest! 3029 outstanding Bargains, 31 states. Mailed Free. Buy now and Save thru Strout. 255-ZB 4th Ave., New York 10, N. Y.

10 ACRES good land $250.00, $10 down, $10 monthly. R. W. Stewart, Inverness, Fla.

31 POULTRY AND SUPPLIES

RAISE Turkeys the new way. Write for free information explaining how to make up to $3,000 in your own backyard. Address National Turkey Institute, Dept. 57, Columbus, Kansas.

POULTRY Farmers—Broiler Growers—Turkey Raisers read the new American Poultry Journal for latest ideas and greater profits. 12 months, 50c. Special offer, 4 years $1.00. American Poultry Journal, 558 South Clark, Chicago.

32 PROFITABLE OCCUPATIONS

WANT a Diesel Job? Our approved, up-to-the-minute Diesel Training Program can help you qualify for steady, big pay jobs or specialized military training. Covers Diesel, Tractor, Heavy Equipment. Easy to master. No loss of present income. Job Placement Advisory Service. Investigate! Write for information today. Interstate Training Service, Dept. 2A, Portland 13, Oregon.

RAISE Fishworms. Easy, Profitable. Free Details. Huffman's Worm Ranch, Rives Junction 5, Mich.

$5 HOUR Easy! Sell name plates for houses. Free Sample, order blanks. Write: National, 214 Summer, Boston, Mass.

BE independent, be secure, have your own profitable business—earn $20.00 and more a day making beautiful, fast-selling lamps at home. No equipment needed. Illustrated course teaches you quickly. Course, parts catalog, wholesale price list—only $2. Gearon Co., Dept. 200-A1, 27 S. Desplaines, Chicago 6, Ill.

LIFETIME income as Notary Public. Appointment assistance. Stationers, Helotes 50, Texas.

FREE book "How to Make Money With Home Workshop" describes amazing methods used by hundreds of successful craftsmen. Tells what to make, How to sell workshop output spare time. Write at once for details. Remember it's free! Craftsman, 115-B1 Worth St., New York City.

HAVE Fun! Make Money! "Working with Leather"—64-page booklet tells how. Send 25c for copy. Free catalog and valuable information included. Wilder-Craft, 1040 Crosby, Chicago 10.

DETECTIVES Earn Big Money. Excellent opportunity. Detective Particulars free. Write. Wagoner, P-125 West 86th, New York 24.

$5000 FROM half acre growing Ginseng, crop bought. Particulars 10c. Associated Growers, Sperling, Manitoba.

$40.00 WEEKLY. Made growing mushrooms. Fresh, Dried. Dominion Patent 331,583, free spawn. North American, 169Y Yonge, Toronto, Canada.

RABBITS, Cavy's, etc. Magazine 15c. Small Stock Farmer, Fairlawn 3, N. J.

MUSHROOMS Grown. Boxes, Barrels. Instructions 50c. Spawn $1.00. Manureless process, $2.00. Gordens, 553 William, Winnipeg, Manitoba.

100,000 NYLONS, Rayons, Cottons, 8c pair, up. Sample Razor Blades. Complete Stock List, 25c. Sibert Company, Chattanooga 4, Tenn.

RAISE Fishworms. Easy, Profitable. Send 25c in coin for complete instructions. Huffman's Worm Ranch, Rives Junction 5, Michigan.

GOLDEN Hamsters Marvelous New Animals Instructive Profitable. Woodworth's Hamstery, Glendora, Calif.

EARN Money in Spare Time in Radio and Television. Send for full information. Receive Free copy of Radio Trouble-Shooting Guide. Progressive Electronics Co., 497 Union Ave., Dept. PS 100, Brooklyn 11, New York.

33 BOOKS, PERIODICALS, ETC.

STRANGE Stories! Sample and illustrated literature, 25c. Stone, Lunenburg 22, Mass.

WHAT Every Mason wants. We have Masonic books for Blue Lodge, Chapter, Commandery, Scottish Rite and Shrine. Our rituals are used the world over. Send for our free catalog of books and rituals for Masons, Odd Fellows, Knights of Columbus, etc. Ezra A. Cook, Publisher, Inc., P. O. Box 796-PS-JY, Chicago 90, Ill.

MAGAZINES (back dated)—foreign, domestic, arts, Books, booklets, subscriptions, pin-ups, etc. Catalog 10c, (refunded). Cicerone's, 86-22 Northern Blvd., Jackson Heights, N. Y.

UNUSUAL, strange out of print books. Send 25c for catalog and private collectors list. Hollywood Book Store, Dept. N, Box #2221, Hollywood 28, Calif.

BOOKHUNTERS! All Subjects. Send Wants! Jaher Book Service, 620-K East 178 Street, New York 57.

SAVE through subscriptions. Free list. Rural Magazine Agency, Grenada 2, Miss.

UNUSUAL Books. Sell Out List Free. Special 9 Books $1.00. Persil, 436 N. Y. Ave., Brooklyn 25, N. Y.

BOOKS, Magazines, Arts, Novelties, Booklets, etc. Catalogue 10c. Kogan, 1032-SP, Church Annex, New York 8.

FREE Book Catalog, "The Mysteries," Occultism, Prophesy, Astrology, Masonry, Comparative Religion, Philosophy, Theosophy, Yoga, Spiritualism, Occult Fiction, Business Projects, Hobbies, Courses, Self-Improvement Book Company, 1130 Keller Avenue, Louisville 13, Kentucky.

HARD-To-Find Books supplied. Send wants. Pierce's, Winthrop, Iowa.

COMIC Character Booklets, Fully illustrated favorites can be yours, 6 different $1.00, $2.00 brings 15. No COD. Jane Kelly, Dept. P-1, P. O. Box 22, Kensington Sta., Brooklyn 18, N. Y.

BOOKS For Pennies! Technical, fiction, non-fiction, others. Send $1.00 for sources, sample. Pioneer, Covington 4, Virginia.

BACK-date Magazines. Specific issues; years. Arkell's, Tarzana 2, Calif.

"OUR Saviour's Message." $1.75 with order. Postpaid. Box 363, Farmland, Ind.

HOW To Find Your Supply! Scriptural "key" to prosperity. 25c. Ward, Box 283-PS, Richmond, Indiana.

35 MAGIC TRICKS, PUZZLES, ETC.

584 PAGE Catalog, 7500 Novelties. Jewelry, funmakers, gadgets, hobbies, sports, tricks, jokes, timesavers, radios, animals, music, guns, etc. 10c. Johnson Smith Company, Dept. 313, Detroit 7, Michigan.

WE supply every noted magician. Large professional catalog 50c. Holden's, P220 West 42nd Street, New York.

MAGICIANS', Gamblers' secrets exposed. Cards, Dice, Punchboards, Slot Machine. Catalog 10c. Book Co., Box 671, St. Louis 1, Mo

200 ELECTRIC stunts, 110 volts, $1.00. Cutting Sons, Los Altos 2, Calif.

500 TRICKS new 1950 edition now ready! Send only 10c for your copy, containing latest in good magic for pocket, parlor, stage. Unequalled service to magicians for 30 years. Douglas Magicland, Dept. 2, Dallas, Texas.

VANISHING Quarter trick and catalog 25c. Sterling Magic Co., Royal Oak, Mich.

512-PAGE catalogue of 2500 tricks, pocket, parlor, stage. World's, Finest Magic. Send $1.50 for catalogue (refunded first $6.00 order). Kanter's, S-1311 Walnut, Philadelphia 7.

VENTRILOQUISM Taught. 3c stamp brings particulars. Smith, 801 Bigelow, Peoria 5, Illinois.

MAGIC package "Eztodo" unique tricks 50c. Catalog free. Magiden, 716 Pine, St. Louis, Missouri.

MAGIC Tricks and Joker's Novelties. Latest illustrated price list Free. Pineland Magic Center, Metedeconk, New Jersey.

FREE Trick And Catalog 25c. Lerro's Magic, 509 80th Street, Brooklyn, N. Y.

500 TRICKS—Magic—Cards—Jokers Sensational Funmakers—Puzzles—Shooting Novelties—Hot Numbers—Catalog 20c. Andersen's, 6815-S Ardmore, Chicago 31.

BE a Magician. Large professional magic catalog of latest tricks, 35c. Ireland, P-109 North Dearborn, Chicago.

"VENTRILLO." Professional Voice Thrower and Catalog 25c! Box 971-PS, Philadelphia.

MAGIC Monthly. Year 25c. Sample and Magic Catalogue free. Magic Shop, Minneapolis 2, Minn.

VENTRILOQUIST Dummies. Catalogue 25c. Be a ventriloquist. Free Particulars. State age. Maher, Box 36-S151, Kensington Station, Detroit 24, Michigan.

ESCAPE from any Handcuff, Sensational secrets. Twenty-year professional. Book, $1.00. Martully, 86 Akron, Westmont 1, N. J.

36 GAMES, ENTERTAINMENT

ROME Slot Machines, Punchboards, Novelties. Webb Amusements, 4966 West Chicago Ave., Chicago 51, Ill.

37 COIN COLLECTING

OLD Money Wanted. Will pay Fifty Dollars for nickel of 1913 with Liberty Head (not Buffalo). We pay cash premiums for all rare coins. Send 4c for Large Coin Folder. May mean much profit to you. Numismatic Co., Dept. 30, Fort Worth, Texas.

GET Profit and Pleasure in collecting old coins. Send 10c for 56-page illustrated coin catalog. You'll be delighted with it. Send for it now. B. Max Mehl, 374 Mehl Building, Fort Worth, Texas. Largest rare coin establishment in U. S. Established 51 years.

U. S. coins lowest prices. Send stamp for lists. Hutchinson, 3463 I Street, Philadelphia 34, Penna.

COIN collectors new magazine, just out, and two wooden nickels 10c. Lawrence Brothers, Anamosa, Iowa.

1878-S, 1881-S UNCIRCULATED Dollars $5.00. Gold Purchased. Willard, 5719 Kenmore, Chicago 40.

COMMEMORATIVE $½ — Columbus, Washington, Cleveland, Stone Mountain, $1.50 ea. Illustrated Catalogue 25c. Norman Schultz, Salt Lake 9, Utah.

FREE! Foreign coin, banknote and Coin Collectors' Illustrated Catalog to approval service applicants. Send 3c postage. Tatham Coin Co., Springfield-D50, Mass.

COINS Wanted: Itemized list 20c. Elsholz, Box 9014-S, Pittsburgh 24, Penna.

BIG $2 Bill $2.75. Giant Bargain Catalogue 25c. Bebee's, 1180 East 63rd, Chicago 37, Illinois.

BARGAINS! Rare collection contains United States 1903 cent, Colonial coin before 1790, half cent, Flying Eagle cent, 1863 cent, 1865 cent, uncirculated 1909VDB cent, 1923 S cent 3c piece, 3c Silver, 3c nickel, half dime, Shield nickel, 1883 nickel, 1913 nickel, Liberty seated dime, Liberty seated 50c, old $3.00 bill, Southern bill, Civil War cent, Jackson cent, foreign coin, foreign bill, ancient coin 1500 years old, complete buying-selling catalogue everything $4.00. 20 different Indian cents $1.00. 10 different Liberty nickels $1.00. 15 different large cents $3.00. 1864 L cent $2.00, everything $10.00. Catalogue 25c. Worthycoin Corporation, 294 Washington (D-405), Boston 8, Massachusetts.

38 OLD STAMPS WANTED

I WILL Pay $100.00 each for 1924 1c green Franklin stamps rotary perforated eleven (up to $1000.00 each unused). Send 10c for Large illustrated folders showing Amazing prices paid for old stamps, coins & collections. Vernon Baker, PS-12, Elyria, Ohio.

40 STAMP COLLECTING

FREE! 100 Worldwide different stamps to approval buyers. Big U.S. and illustrated bargain lists sent with approvals. Bookman, Maplewood 1, N. J.

FREE—Cuba Roosevelt issue and illustrated catalog. Littleton Stamp, Littleton 11, N. H.

AMAZING Offer! 500 United States stamps—including commemoratives, airmails, high values to $5.00—Only 10c to Approval Applicants!! Illustrated Bargain Lists free. Mystic Stamp Co., Dept. 55, Camden, New York.

300 DIFFERENT given free with approvals. Postage 3c. Windsor Stamps, 1435 E. 67th Place, Chicago 37.

750 FRANCE and colonies stamps 10c. Littleton Stamp Co., Littleton 26, N. H.

500 STAMPS For Only 10c! This mammoth value includes Airmails, Pictorials; stamps from strange countries cataloguing up to 25c each!! Also approvals. Mystic Stamp Company, Camden 55, New York.

200 DIFFERENT, including Roosevelt triangle, 5c to approval applicants. S. Avalon Stamp Co., Springfield, Mass.

FREE—Rare stamps from mysterious Nepal, plus octagonal (eight sided stamp). Giant triangle, gorgeous diamond, mammoth, midget stamps, value exceeds $2.00. All free to approval buyers. Stamps, Box 58, Santa Ana, California.

COLUMBIANS, Trans-Mississippi, Pan-Americans, Pan-Pacific, ten other different commemoratives. All 10c with your request for US approvals. Moda Stamps, Box 251-V, C.S.A., New York 8.

FREE! Powerful Magnifying Glass. Jamestown Stamp, Jamestown 207, N. Y.

PAYING High prices for approvals? If your collection numbers under 15,000 try our 1c and 2c approvals. In books of 1000 different. Lots to choose from at lowest prices. Also special offer to customers. Clark, Box 544U, Muskegon, Michigan.

UNITED States stamps nearly 100 years old. Roosevelt set, others, 40c value—only 6c to applicants United States approvals. Wakonda, Box 272-H, Jackson Heights, N. Y.

FIRST U. S. (1847) Government Reissues 5c, 10c, plus Giant Bargain U. S. Collection—only 5c to applicants U. S. approvals. Metropolitan, Box 312K, Jackson Heights, N. Y.

FREE! Two Giant "Cardboard" Triangles, Midget Bolivia Triangle, Borneo "Anteater," 50 year Tasmania, Porto Rico, Dead Countries, others. Free to approval buyers for 3c postage. Potomac Stampco, Washington 15, D. C.

FREE. Scott's International Album. Other big premiums. Full particulars with approvals. Raymax, 123X William St., N. Y. C. 7.

FREE—Famous Americans Set, Flag Set, National Parks Set, and Presidential Set to $5.00. A total of 90 Stamps Free to Customers for our unsurpassed U. S. and foreign selections. Send 3c for 15 of the above Stamps and full particulars. Triboro Stamp Co., 145 Nassau St., Dept. 201, New York 8.

TOPS! Our book "How to Collect Stamps." Send for your free copy today! Littleton Stampco, Littleton 29, N. H.

WHOLESALE lists to dealers. 3c postage. Grossman, 106 West 42nd, New York 18.

PAY less. Buy more. Books of 1,000 at 1c & 2c each. Very good fillers. Attractive stamps. Adults only. Graveline, 14702 Troester, Detroit, Michigan.

25 U. S. Commemoratives—All Different from 1893 Columbian to present day issues. This U. S. commemorative collection only 5c to approval applicants. S. L. Engel & Co., 38 Park Row, New York 7, N. Y.

FOREIGN stamps at 1/10 catalogue value. You send in references and we send the stamps. No low catalogue stamps included. Roseland Stamp Co., Dept. 9A, Spring Lake, Michigan.

50,000 STAMP Grabags 25c each. Anderson, 630a Bingaman, Reading, Pa.

FREE! Scarce Atomic Bomb Airmail! Approvals. Star Stamps, Jamestown, N. Y.

SCARCE Bahawalpur Jubilee Set free to approval buyers. Plymouth F3, Bell, Calif.

PENNY Approval Bargains!—Write Dept. PSM, 1267 Tutwiler, Memphis 7, Tenn.

FREE! Monaco nude, Britain 2½ shilling, Mozambique bridge stamp, India Peace, Gandhi Independence issue, plus 100 others, with approvals. Moumblow, 740 Hagney, Bronx 56, N. Y.

FREE! Sample Collection! Lists! Send Postage. Stampmart Co., Hartford 1, Conn.

FINE Approvals. Fast, personal service. What countries do you prefer? I'll send their stamps. Milton Skinner, 438 Locust, Long Beach 12, Calif.

POSITIVELY Greatest Free Offer! Latest Scott's International $6.00 stamp album—covering entire world, contains 36,000 illustrated descriptive spaces; Scott's 1949 Standard $7.00 catalogues "Philately's Encyclopedia"—absolutely Free to applicants for foreign approvals becoming customers. Approval Service, P. O. Box 1700, San Francisco.

FREE Arabian Circular. Extremely cheap prices. Arshak, Box 222, Baghdad—Iraq.

500 EXOTIC Japan Stamps—10c! Kenmore, Richford J-58, Vermont.

BAHAWALPUR set 10c. Profit sharing approvals. Rheaume, 6591 11th Ave., Montreal, Canada.

307 ALL Different—Only 15c! Beautiful collection: Commemoratives, Triangles, High Values, Bicolored Stamps, etc. Garcelon, Calais 418, Maine.

PENNY Approvals. Fine Quality. Free Premiums. John McCown, Catlettsburg, Ky.

100 OLD U. S. between 1861 and 1935 50c. Roush Stamps, 51 Chestnut, Mansfield, Ohio.

ALBUM, Hinges, Gauge Detector Stamps, Sets. All 10c. Approvals. Cornette, 228 West 25th, New York 1.

1025 DIFFERENT Stamps. Catalogue Value $25.00. Only $1.00. Baystate, 44 Bromfield, Boston 8, Mass.

COMPLETE Roosevelt set, other commemoratives 5c with U. S. approvals. Locust Stamp Co., Box 390A, Peekskill, N. Y.

UNUSUAL—Unheard of cancelled sets of Roosevelts and Washington bicentennials complete. All yours for fifteen cents. Bargain approvals accompanying. Park Stampco, Box 191, New York 21, N. Y.

FREE: Mint British Colonies from Brunei, Nauru, Dominica, Ascensions, Solomon Islands, Caymans, Tonga, Gilbert, Ellice, Pitcairns—free with approvals! Viking, 130-P Clinton St., Brooklyn, N. Y.

50 DIFFERENT U. S. 10c. No approvals. Price list free. Seidenberg, Appleton, Wis.

FREE Packet 100 Different Penny Approvals. Alleman Stamp Shop, 11 Wall Street, Fort Lauderdale, Florida.

200 U. S. Commemoratives, Old and New, $1.00. Weatherby, Medina, Ohio.

TRAINS! Trains! Trains! 12 train stamps and packet of 100 different stamps for 10c with approvals. Reich Stamp Company, 4647 Kenmore, Dept. 830, Chicago 40, Ill.

FREE Lists: Sets, Packets, Collections. Schneider, Route 3, Box 555, McHenry, Ill.

AMAZING Offer! Scarce 90 year old Nova Scotia, Newfoundland, Canada. Big assortment only 10c with approvals. Garcelon, Calais 101, Maine.

"KING Size" stamp of Japan—free with foreign approvals. Grey, 46 Lent, Poughkeepsie, New York.

FREE Catalog! Illustrated. Forty pages. United States, Foreign, Albums, Supplies. "How to Collect," etc. Harrisco, 204 Transit Bldg., Boston 17, Mass.

PENNY Approvals by country. M. H. Hoerning, 102, Farmington, Ark.

U.S. 797 SPA Sheet only 5c to applicants for U. S. approvals. M. Haycock, 235 86th St., Brooklyn, N. Y.

½c-1c APPROVALS! 12,000 bargains! Cole, 43-G Rinewalt, Buffalo 21, N. Y.

FLAG Stamp—Free with hygrade U. S. approvals. Weniggman's, 1933 Patterson, Chicago 13.

DIAMOND, Pigmy, Jumbo, other queer stamps — Free with bargain-packed, excitingly "different" approvals. Niagara Stamps, Niagara-on-the-Lake 13, Canada.

MONACO Nudes Set—10c. Approvals accompany. Atlas, 3210-P Republic, Racine, Wisconsin.

STAMP Magazine! Copy Free! "Stamp Post." South Catalina, Pasadena 1, Calif.

WE Give Away—Your Choice Latest Scotts Albums; Catalogue and available philatelic accessories. Realize—You Get These Worthwhile Rewards When You Buy From Our Better Foreign Approvals. Write Today For Full Particulars Sent With Trial Approval Selection. Americas' Stamp Service, Riverside, Calif.

UNITED States approvals complete coverage fine quality, attractive prices. Seminole Stamps, Box 113E-S, Coral Gables, Fla.

FREE "Stamp Finder." Tells instantly country to which any stamp belongs. 32 pages profusely illustrated. Garcelon, Calais 18, Maine.

FREE Collection—50 different glamorous French Colonials—animals, natives, villages, bicolors, pictorials, all to approval buyers; also Scott Albums and Catalogs. Bell Stamp Service, Dept. W, Bell, Calif.

WORLD'S Largest Stamp (7½ x 14 inches). A real curiosity! Retails for 50c, only 3c to approval applicants. Tatham Stamp Co., Springfield 50, Mass.

"HOW To Recognize Rare Stamps." Free Book Illustrated! Kenmore, Richford H-58, Vermont.

FINE U. S. Exclusively. Glades Stamp Co., Box 2843, Miami 18, Florida.

OLD, scarce U. S. seconds on approval. Slightly defective bargain prices. Hearnfeld, Clintonhill Station, Newark 8, N. J.

10,000 DIFFERENT 1c each! Gordon Davison, Box 1019, Manchester, N. H.

FREE—Five Foreign Sets, Approvals. Stoll, 2634 Burnett, Louisville 10, Ky.

50 DIFFERENT stamps 10c with approvals. F. Tunis, 54 Wakeman, Newark 4, N.J.

SPECIAL Bulgaria Set Catalogue $1.87, 10c with Approvals. Kingman, Highbridge, Box 42, New York 52.

110 DIFFERENT Hitlers, Roosevelt, Liberia, Haiti, etc. 10c. Buckey, PS-208 Ludlow Bldg., Dayton 2, Ohio.

WORLDWIDE Stamps. All Different. 200—25c 500—50c; 1000—$1.00; 2000—$2.50; 5000—$12.50. Beacon Sales, Maynard 3, Mass.

"GOYA Nude" set complete 50c. (Catalogs $1.55) Approvals. Royal Stamp Company, Tamaqua 3, Penna.

FREE 11 Japan War Stamps. Approvals. Schroeder, 636 Charles, St. Paul 4, Minn.

FREE Gigantic Beautiful BI-Colored Mint, U. S. Yorktown Stamp to Approval Applicants. Mohawk, Box 524, Albany, N.Y.

MOZAMBIQUE Triangulars, unused set 10c with approvals. Vargo Stamps, 6044 South Fairfield, Chicago 29, Illinois.

FREE! Triangle, Diamond, Midget, Giant, Roosevelt; Hitler Stamps To New Customers. Thrifty Stamps, Silver Spring, Maryland.

MAGNIFICENT! Nineteenth Century U. S. Plus Civil And Spanish War Revenues, 20 Different, 10c To Approval Applicants. AAA Stamp Company, Arcade Building, St. Louis 1, Missouri.

DJIBOUTI Steam Locomotive, Chinese Hunger Stamps, Angola, Seychelles, 100 fascinating others, 10c with approvals. Atlas Stamps, 4220 West 16th, Little Rock, Arkansas.

100 DIFFERENT Worldwide, 5c. Approvals. Stearns, Box 602-C, Inkster, Michigan.

FREE U. S. catalogue. Over 500 illustrations for stamps, albums, supplies. Stone's, X-52 Dorchester 24, Mass.

AMERICA'S Best 2c Foreign Approvals. Moffat, 921 College, Rock Hill 3, S. C.

SEND for free folder "How to sell stamps profitably by mail". Sure-fire ideas, plans. Write Science Syndicate, Box 803 A, Milwaukee, Wisc.

FREE—Illustrated Catalog! Kenmore, Richford C-58, Vermont.

WOW! 203 All Different Germany 10c! Zeppelins, Semipostals, Airmails, High Values, etc. to new customers. Jamestown Stamp, Jamestown 509, New York.

FREE! Tiny Chinese "Midget" War set. Approvals. Seminole, Leeds 10, Ala.

DEALERS Wholesale catalog. Postage 3c. Franksco, 5031 Queensbury, Baltimore, Maryland.

42 HOBBIES, COLLECTIONS

50 DIFFERENT army embroidered patches $1. Other bargains. Insignia Mart, 703B Broadway, N. Y. C. 3.

EXCHANGE Viewcards with members world over. 10c brings magazine with list members. World Viewcards, King, N. Car.

INVENTING can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors, Dept. 30-E, 631-E St., N. W., Washington 6, D.C.

UNUSED matchbook covers—100 different $1.00—Catalog 25c—Charles Edelman 1311P East 84, Cleveland 3, Ohio.

MEN and boys only—collectors, craftsmen, sportsmen, amateur photographers, musicians, writers—all hobbyists, join "The Hobby Directory." Contact new friends throughout U. S., Canada and abroad. For free introductory folder write Box 91, South Orange, N. J.

START a profitable and Fascinating Hobby. Learn Radio and Television at home at a minimum cost. Send for full particulars. Receive free copy of Radio Troubleshooting guide. Progressive Electronics Co., 497 Union Ave., Dept. PS 200, Brooklyn 11, N. Y.

44 ANTIQUES, RELICS, INDIAN GOODS

INDIAN Digest—Six issues, 50c. 38 Ridgewood Avenue, Glen Ridge, N. J.

SELLING 700 Historical Firearms, 20,000 Indian Relics, Coins, Collectors Cartridges, Confederate Money.—Revolutionary, Civil-war, Indian War, Muskets, Swords, Pistols, Bayonets, Ramrods, Flintlocks, Percussion Caps, Duelling Pistols, Pepperboxes, Carbines. Kentucky Rifles.—Arrowheads, Spearheads, Wampum, Gempoints, Tomahawks, Bannerstones.—Steerhorns, Buffalo Horns, Antlers, Bio-horns, Powderhorns, Mounted Pheasants, Owls, Squirrels, Bo-wood, Bulletmolds, Blunderbusses.—Agates, Fossils, Minerals, Marine Shells, Ambrotypes, Daguerreotypes, Gold Dollars. Get our profusely illustrated catalog, Send 35c. Heike, Wenona 40, Illinois.

4 FINE Indian Arrowheads $1.00. Extra Fine Tomahawk $2.00. List Free. Lear's, Glenwood, Arkansas.

SPECIAL: 10 Indianheads $ .68—Bayonet $1.98 — 8 Arrowheads $1.48 — Tomahawk $3.65 — Civilwar Swords $8.88 — Scalping Knife $1.45 — Agate $ .48 — Fossil $ .48 — Geode $ .48 — Violin Wood $7.50. Heike, Wenona 40, Illinois.

46 MINERALS & PRECIOUS STONES

MINERALS, Gems, Gem Materials, Carvings, Gifts of Beautiful Onyx. Send For Free Price List. Warren's Minerals And Gems, 1969-B Abbott St., San Diego 7, Calif.

GEMSTONES, Mineral specimens. Every variety. Lowest prices. Postcard brings free booklet. Plummer's, 2183D Bacon, San Diego 7 Calif.

AGATES, Gems, Free list. North West Gem Shop, Box 305, Tacoma 1, Wash.

LOW priced prospecting Geiger Counter. Smallest, lightest, manufactured. Guaranteed operation. Free literature. Batson Electronics, 1030 S. 27th St., Omaha, Nebr.

47 CAMERAS, PHOTO SUPPLIES

BASS Says: Trading cameras a national habit since 1910. Write to Bass the old "Horse Trader." A postcard will do. Simply say: "Bass, I have and I want ... How much will you allow me"? It's fun to trade with Bass. Satisfaction guaranteed. Bass buys, sells, and trades. Bass Camera Company, Dept. AG, 179 W. Madison St., Chicago 2.

LEITZ Valoy Enlarger, perfect, $32.50. Write for Free catalog of outstanding photographic values. Empire Camera Exchange, Dept. PS-1, 74 E. Post Road, White Plains, N. Y.

ADD "Spice" to home projection shows with colorful old-time Nickelodeon slides. 2x2. Write for Free list. Nickelodeon Co., New Fleidner Bldg., Portland 5, Oregon.

KODACHROME slides of scenic, historical East. Cape Cod, White Mountains, Lexington, Plymouth, Gaspe, Santa's Workshop, Fall Foliage, Niagara, many others. Catalog Free. Pilgrim Colorslides, 81 Bosworth St., Boston 8, Mass.

PHOTOMURALS. Your negatives or ours. Catalogue 25c. Photomammoth, 12048 Vanowen St., North Hollywood, Calif.

KODACHROMES of Lake Louise and Jasper on approval. Douglas Whiteside, Yosemite, California.

KODACHROME slides. Beautiful coast scenes. Lists and three samples $1.00. Maine Photos, Box 1622A, Portland, Me.

48 PHOTO FINISHING

OIL coloring photographs can be a fascinating hobby or profitable sideline for those with artistic talent. Learn at home. Easy simplified method. Send for free booklet. National Photo Coloring School, 835 Diversey Parkway, Dept. 1721, Chicago 14, Illinois.

1c PRINTS or 8 Jumbos from Roll, 25c with this ad. Y Skrudland, River Grove, Ill.

GUARANTEED first quality work. 8 exposure roll printed and developed 30c, 12—45c, 20—60c. Western Photo Service, Dept. P.S., Box 298, San Francisco 1, Calif.

BEAUTIFUL amazingly life-like miniature, new process, from your own negative. Choice gold or silver frame. Guaranteed. Send good negative and $7.50. Photo-Miniature Service, Box 64, Fairport, N. Y.

50 PHOTOPRINTS, PHOTOCOPIES

24 GLOSSY Photos. Beautiful Models $1.00. Illustrated catalog 25c, none free. Nutrix Co., Dept. D-37, 212 East 14 St., New York 3, N. Y.

PHOTOCOPY Anything—Papers, books. No darkroom. 8½"x11" complete $6.95. Fotofiek, 3751 St. John's Terrace, Cincinnati 36, Ohio.

51 MOTION PICTURES, SOUND EQUIPMENT

BASS Says: Leadership since 1910 guarantees satisfaction. Finest Cine equipment: 8mm., 16mm., and 35mm., silent and sound. Write the old "Horse Trader." Satisfaction or your money back always! Bass Camera Company, Dept. A, 179 W. Madison St., Chicago 2.

BETTER 8mm and 16mm Movie Camera Film. Free Equipment Catalog. Better Films, 742 New Lots, Brooklyn 7, N. Y.

LATEST Beauty Glamour Films. Sample, 8mm 50 ft. only $3.75. 25c brings exclusive catalog of movie titles. Empire, Dept. PS-1, Box 23, White Plains, N. Y.

8-16MM. Silent-sound films. Complete rental library. All latest subjects. Free catalogue. (sample film 10c). Garden Film, 317 West 50th, New York 19.

RENT 16mm. sound films 50c reel. Large selection; free catalog. U. C. Film Service, 128 Chestnut St., Roselle Park, N. J.

THE World's Greatest Story, "Entire Life of Christ" 8mm, 16mm, Sound & Silent. Rent or Purchase. Hemenway Film, 33-W Melrose Street, Boston 16, Mass.

50% OFF—Brand New Films—$5.50 8mm now 2 for $5.50—$8.75 16mm now 2 for $8.75—Other bargains. Send for list. Stark-Films—Balto. 1, Md., Dept. P.S.

16mm. SOUND film bargains! Used: 100' Panoram musicals, $9.95, dozen; cartoons, $5.95 each; sports, $7.95. Brand new prints discontinued $17.50. Castle cartoons, $8.95; musicals, $9.95. Write for free catalog 6-J. Blackhawk Films, Davenport, Iowa.

GUARANTEED Fresh 8mm roll, magazine; 16mm roll, magazine movie film. Color, b&w. Free catalog. ESO-S, 47th Holly, Kansas City 2, Missouri.

EXCITING, Colorful Movies (8-16mm.). Enormous Selection. Cameras, Accessories. Bargains! Big illustrated catalog, 25c; refunded first order. National Film Supply, Toledo 9-E, Ohio.

"CINE-Voice" Sound-On-Film Camera shoots your own 16mm Color Talking-Pictures. $695.00. Write for free illustrated folder. Berndt-Bach, Inc., 7347 Beverly Blvd., Hollywood 36, California.

100 FOOT 16mm. Film Free processing. $2.50. Promaders, Box 637-B Davenport, Iowa.

1951 ROSE Parade Movies. Kodachrome. Colorful floats! Beautiful girls! 16mm 200' $29.95, 8mm 100' $14.95. C.O.D.'s accepted. California add tax. Avalon Dagget, 441 North Orange Drive, Los Angeles 36, Calif.

WE trade, sell, buy movie films. Gallard, 29C Coe Ave., Hillside, N. J.

1000' Silent-Sound projection film, $7.50. International, 2120 Strauss, Brooklyn, 12, New York.

CLEARANCE Sale of 16mm Films. Want a real buy in 16mm Sound Films? Take advantage of the I.C.S. 1951 Clearance Sale of 16mm sound Features: comedies, cartoons, novelties, musicals, new, used. Specify. Send for our giant list "A" today stating machine you own (make and model). Institutional Cinema Service, Inc., 1560-PS Broadway, New York 19, N. Y.

WILD animal films, 16mm, 8mm, Natural color, black-white, Sound, silent. Complete life stories, thrilling closeups, taken by famed Eberhart organization. $1.75 and up. Send for free illustrated catalog. Wild Life Films, Dept. 1-PS, 6063 Sunset Blvd., Hollywood, California.

52 MUSIC, MUSICAL INSTRUMENTS

POPULAR Piano Lessons by personal correspondence. Beginners or advanced. Two new popular songs with every lesson. Play 2 songs very first lesson or money back. Send for free details. Stuart Piano Studio, 1227 B Morris Ave., Union, N. J.

PHONOGRAPH Records Cheap. Catalogue. Paramount, PT-313 East Market, Wilkes-Barre, Penna.

POWERFUL, Strong, Magnetic Voice developed with Diaphragm Exerciser (New Invention). Write, Inventor Co, Box 665-(41V) St. Louis, Mo.

53 SONG WRITERS

WANTED! Poems for musical settings. Write Songwriters' Service, Clifton, N. J.

POEMS Wanted to be set to music. Free examination. Send poems. McNeil, Master of Music, 510-PS, S. Alexandria, Los Angeles, California.

SONGWRITERS. Opportunity for recording on royalty basis by large Recording Company with national sales, distribution. Send song material. Free Examination. No charge for melody. Lead sheets, records furnished. Music Makers, Dept. F-4, Box 1989, Hollywood, California.

POEMS Wanted for musical setting. Send poems for free examination. Five Star Music Masters, 646 Beacon Bldg., Boston, Mass.

POEMS Wanted. Broadcast consideration. Sooner Song Co., 22 Northwest 8th, Oklahoma City 2.

54 RADIOS, SUPPLIES & EQUIPMENT

EARN while building radios. Learn television. Experience unnecessary. Parts, tools, instructions supplied. Free details. Federal, 176-71 Union Turnpike, Flushing 1, New York.

FIX any radio. Amazing new instrument locates radio troubles double quick. Simple instructions show you how. Thousands now in use. Free—Write today for 32-page illustrated technical manual. "The Inside Story." Feller Engineering Co., Dept. 1PS1, 1601 S. Federal St., Chicago 16, Ill.

MAKE simple, tubeless, batteryless, distance-getting crystal radios. Crystal and illustrated instructions 25c postpaid. Allen, 427-S, Clinton, Mo.

FREE! 212 page Radio and Television Catalog! World's largest stocks, lowest prices. Complete supplies for builders, experimenters, amateurs, servicemen. Latest radios, phonos, television, recorders, sound equipment. Thousands of parts, tubes, test instruments, books, diagrams. Top quality money saving values. Get it now! Allied Radio Corp., 833 W. Jackson Blvd., Dept. 31-A-1, Chicago 7, Illinois.

PORTABLE Crystal Radio. No Aerial. No Ground. Send 50 cents for Crystal detector, drawings, and instructions. Bill Cotter, Washington 18, D. C.

FREE! Tube and parts catalogue. Sutter, 1044 Rutland, Brooklyn 12, N. Y.

FREE—Send for latest radio catalog and bargain bulletin. Has thousands of top values in television, radio, electronic supplies. Concord Radio Corp., Dept. KA-51, 901 W. Jackson, Chicago 7, Illinois.

24 PAGE Plans "18 Crystal Sets" (SW record 5800 miles) 25c, including "Radio-builder," catalog. Laboratories, 411-T Capitol Hill, Reno, Nevada.

BUILD 15 radios at home, only $1.30 each. Experience unnecessary. Home Radio Course includes Trouble-Shooting and Servicing. Lessons, Quizzes, and all parts and instructions. Nothing else to Buy. Earn money doing Radio and Television repairs while learning. Prepare for Profitable Future. Free Trouble-Shooting Tester with each course. Send for full particulars and receive absolutely Free a copy of the Progressive Trouble-Shooting Guide. Progressive Electronics Co., 497 Union Ave., Dept. PS 10, Brooklyn 11, N. Y.

55 TELEVISION

LEARN Television, adjustments, repair. Manual, special lifeguard circuit, dollar. George Palorno, Box 1351, N. Y. C. 8.

56 BUSINESS OPPORTUNITIES

$4,000.00 PROFIT in two months. No investment. Details 50c. Charles Co., 12 BPH, Norwood, Ohio.

SELL by mail; free booklet, instructions; Manhattan House, P. O. Box 50-L, New York 28, N. Y.

CONVERT hand mowers to power mowers. Do it now, this winter. Sell the Handy-Dandy conversion kits. Easily installed on 16 to 20" mower. Use any small gasoline or electric motor. Quick delivery. Kits purchased with or without engines. Also new Garden Cultivator. Cultivates 3" deep. Attachments available: weed cutter, lawn mower and snow plow. Discount to dealers. LeClaire Manufacturing Company, LeClaire, Dept. PS, Iowa.

35 HOUR Easy! Sell name plates for houses. Free Sample, order blanks. Write: National, 214 Summer, Boston, Mass.

EXTRA Money — No selling — operate vendors. Amazing profits, details Free. Silver King, Suite 282, 622 Diversey, Chicago 14.

GOOD Paying Business Silvering mirrors, plating autoparts, reflectors, bicycles, bathroom fixtures, etc., by late methods. No tanks or shop required, outfit furnished. Free Booklet. Gunmetal Co., Ave. E. Decatur, Illinois.

ENVELOPES addressed accurately, reasonably. Fast Service. We have capable addressers in your city. Glenway System, 5713-X Euclid, Cleveland 3, Ohio.

OPERATE profitable mail order business. Write Walter Service, 4159-B East 112th, Cleveland 5, Ohio.

$25 WEEKLY working two hours daily. No canvassing. No Manufacturing. Lycke, Box 2471-B, Cleveland 12, Ohio.

137 PLANS to make money local, mail order. Particulars free. Elite Co., 220-A Grand St., N. Y.

BE Appointed State Notary Public now! Details. Stationers, Helotes 50, Texas.

MAKE money addressing envelopes. Our instructions reveal how. Glen Glenway, 5713 Euclid, Cleveland 3, Ohio.

VENDING Machines earn big money! An investment as low as $10.50 will start you in this fascinating, profitable business that can lead you to the road of success and independence. Routes can be established and operated in either full or spare time with no experience needed. Write for full details and our FREE catalog illustrating our nut, candy, gum and stamp vendors; also pin ball machines, music boxes, etc. Write immediately to: Parkway Machine Corporation, Dept. 9, 715 Ensor Street, Baltimore 2, Maryland.

A FACTORY in your home, garage! Mechanics' waterless hand cleaner, glass cleaner, auto cleaner-polish; many others. All formulas free, but if you also want free samples send 15c postage. Western Aircraft, Dept. G, Los Angeles 6.

RECAST old batteries into new. Latest achievements. Battery Laboratories, Minneapolis.

START Home Business. Free Booklet lists kits and materials. No course, no study, start right in earning. Each kit contains enough for practice and sale. Act. Now! Doner Products, 1115 Sterling Place, Brooklyn 13 B. N. Y.

CASH For your idea. 280 manufacturers need inventions, patented or unpatented. List free. Invention Bureau, 206-S Clinton, Oak Park, Illinois.

START Mailorder Bookshop—Everything furnished. 25c brings booklet, samples, exciting ideas. General Publications, Ossining 1, New York.

MAKE Money spare or full time, casting Metal Toys and Novelties. Big wholesale and chain store demand for cast Metal Autos, Soldiers, Ashtrays, Banks, etc. keep manufacturers busy. Production moulds furnished for up to 100 and more castings per hour. No experience or special place necessary. Write for information, and illustrations of patterns needed. Metal Cast Products Co., Dept. E, 1696 Boston Road, New York 60, N. Y.

EARN while building radios. Learn television. Experience unnecessary. Parts, tools, instructions supplied. Free details. Federal, 176-71 Union Turnpike, Flushing 2, New York.

BIG money! Spare or full time in your home. No Selling! Spray New Miracle Finishes. Plush and Suede, on signs, radios, automobiles, figurines, lamps, toys, etc. Our business is booming. Help us fill huge demand. New easy Flok-Kraft methods. Material costs few pennies. You get dollars. Free samples complete powerful money making plan free. Write now. Coast, 1002-A, Los Angeles St., Los Angeles 15.

NATURAL Molding Latex. Extra thick. Free sample. W. Wooley, 115B Donald, Peoria, Illinois.

EARN big money at home, easy work, no investment, exciting details free. Harrison, 954-c Empire, Benton Harbor, Mich.

MAKE Money At Home as renewal headquarters for all magazines. Liberal commissions. No experience, no capital needed. Supplies furnished. Write for Free Catalog. McGregor Magazine Agency, Dept. 510B, Mount Morris, Ill.

MAKE flexible molds! Cast plaques, bookends, figurines! Free sample! H. Tooker, 630-A Chestnut, Hamilton, Ohio.

METALLIZE Baby Shoes. Repair Dolls. Make Rubber Stamps. Silver Mirrors. Make Beautiful Figurines. Catalogue of "30 Ideas" Free. Universal, Box 1076-B, Peoria, Illinois.

MAKE Perfumes at home, write. "Carey Laboratories," 1914 Chouteau, PS-1, St. Louis 3, Missouri.

BUY Wholesale. Big-name items 40% and more below retail. Folks eagerly patronize you for big savings. Details free. Young's, Kent 1, Ohio.

IMPORT-Export! Men—Women. Learn from established World Trader. Your own profitable world-wide business by mail order from home without capital; or travel abroad. Experience unnessary. Free details. Mellinger, A-2, Los Angeles 24.

MAKE Perfume—Big Profits—Mailorder—Expect Secrets—Write "Imsco". 6347 Farnell-PS-1, Chicago 21, Illinois.

LIQUID Rubber, make flexible molds. Free Sample. Chaney, 1130 E. 16th St., Jacksonville 6, Fla.

HOMEWORK—Addressing—Envelopes—Details—25c. Siegel—P.O.B.—183—Knick.—New York 2.

ELECTROPLATE brass, nickel, chromium, Baby shoes. Free literature. Electroplate, Box 293, Red Lion, Pa.

FABULOUS Earnings—Fascinating pastime. Growing Genuine, living miniature (Ming) Trees. New sensational Business or Hobby. Astounding information Free. Dwarf Gardens, Box 355H, Briggs Station, Los Angeles 48, Calif.

TO $35.00 Weekly. Spare Time. Home Operated Mail Order Business. Successful Small "Beginner's" Plan. Everything Supplied. Lynn, 5710-C Bankfield, Culver City, California.

WORLD'S 1st economical gas turbine Jet engine for automotive use. Wow, for Hot Rods, Custom Built, Dealers Wanted. Literature 25c, Plans $10.00. Jet Engine Co., St. Augustine, Fla.

COLORGLAZED Concrete Pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, "Minnesota"

OPERATE Profitable Mail Order Business. Write Universal, 24-D Main, Tangier, Virginia.

LOCKSMITHING & Keymaking Home training outfit includes key machine, supplies and tools necessary to get started in business. Cut keys by code, master locks, change combinations. Booklet of Information Free. Write today. United Supply & Service, 3327 Madison St., Dept. PS-1, Chicago, Illinois.

"ELECTROPLATING-Know-How" includes baby shoe, chrome and brush plating; other lucrative fields. Learn easily—Free booklet. Joseph B. Kushner, Electroplating Engineer, Stroudsburg 41, Penna.

ELIMINATE Financial worries with the biggest money making opportunity you've ever seen. Ages, West Liberty, Iowa.

SLOT Machines, Punchboards, Wholesale Catalog. Webb Distributing Co., 4966 West Chicago Ave., Chicago 51, Ill.

YOUR own profitable home business. Preserve live flowers to last forever. Spare or full time. New discovery—simple—fascinating. No experience necessary. Send $2.00 for working equipment, instructions and valuable sales plans. Satisfaction guaranteed or money refunded. Hermansen, 210 Fifth Ave., Suite 1102, New York 10, N. Y.

TRADE Magazines help you to success. Get latest copies through our easy-to-get-acquainted service. More than 1200 business, professional, farming, investment, educational, sport, hobby, music, radio, etc. List free. Commercial Engraving Publishing Co., 348 North Ritter, Indianapolis 19, Indiana.

HOW and where to obtain Capital? Free details. Star Service, Wapakoneta, Ohio.

$35 WEEKLY! Home! Two hours daily! Invisible Reweaving! 27 other ways! Government assistance! No manufacturing or canvassing! 25c. Walsh, 894 Main St., Buffalo 2, New York.

BEGINNER'S Mailorder Guide. Valuable folio 25c. Ad-Man Dankmeyer, 2831-P Guilford, Baltimore 18, Maryland.

HOW To Set Up and Run A Mirror Shop! Resilvering Mirrors, Making Chipped Glass Nameplates, Electroplating, Salts and Rectifiers. John Sprinkle V90, Marion, Indiana.

HAVE Your Own Business, Big Earnings Local And Mail Order Get The Facts. Crittenden, Lombard 11, Ill.

$124.50 WEEKLY Guaranteed! At Home. Spare time, $1.00 (deposit). Science Syndicate, Box 791-A, San Antonio 6, Texas.

TIN Cans. Turn them into cash. Nine methods. Instructions 50c. Charles Co., 12-BPG, Norwood, Ohio.

QUICK Money! "Repairing Car Batteries"! At home! Easy too! Batteryman, Grand Junction, Colorado.

WHERE To buy 600,000 Articles Wholesale. Details Free. Krueger, 3418 Wolcott, Chicago 13.

START profitable mailorder business. Copyrighted instructions tell how. Free folder! Edward Lay, 3819 Kenmore, Chicago 13.

UNIQUE business. Profits unlimited. Experience unnecessary. Complete details $1.00. B. Andrews, 49 Riley St., Buffalo 9, New York.

OPERATE Profitable Mailorder Business, Particulars Free. George Lenhoff, Lincoln 1, Nebraska.

UNLIMITED profitable possibilities for wholesalers, retailers, salesmen, through imports from Europe. Write Walter Wolff, 1 Steinlestrasse, Frankfurt/Main, Germany.

UNPAINTED Figurines, Lamp Bases. Finest Selection. Write For List. Wells' Decorative Arts, 3632 W. Flagler, Miami, Florida.

MAKE money making new greaseless doughnuts at home on electric machine. Wholesale to grocers, drug stores, cafes, hamburger shops. Send for free recipes and plans. S. Ray Company, 3605 South 15 Ave., Minneapolis 7, Minnesota.

WANTED! Home Producers by manufacturers in our Clearing House Service. Become a sub-contractor, casting plastic products for these companies. Thousands of easy to make items required. Cash in at home without previous experience. For details write Plastic Service Guild, Dept. P.S., 233 Condor St., East Boston 28, Mass.

MAKE money by mail. Easy, big profits. Everything furnished. Write—Thomas' Service Enterprise, P.O. Box 56, Brooklyn 28, New York.

REAL money making opportunity making Interlocking Concrete building blocks. Rex Products Co., Dept. 21, Piqua, Ohio.

CAN you use $35 week Extra? Operate mailorder business. Nacci, 7731 Heyden, Detroit, Michigan.

BUY it wholesale. Manufacturers, Distributors. Over 850,000 items. Literature free. Olsen, 1231-B East Third St., Duluth 5, Minnesota.

SENSATIONAL New Hand Cleaner! Free manufacturing-distributing plans. "Acro-Sol-Ex". 2438-D Fifteenth, Denver 11, Col.

$46 FROM Scuare Foot Plywood; Jigsaw necessary. Write: Woodart, Bridgewater, Massachusetts.

FREE Illustrated course casting novelties. Genuine latex for molds. Major Chemical Co., 164 Portland St., Cambridge, Mass.

$200 WEEK Possible! Sensational product. Manufacture-distribute. Easy. Free Plan! Keenelo, 2438-D Fifteenth, Denver 11, Colorado.

FREE Folio, 700 Money Making Deals, Plans, Formulas, Supply sources. Kolamite Company, Box 572, Dayton 1, Ohio.

FLOCK, Unpainted Novelties. Low prices. Henry Klewiet, R 4, Kalamazoo 84, Mich.

BABY Shoe Mountings, Casting Formulas and Instructions $2.00—Plastics, Box 1574, Boston (4), Mass.

NEW Proved methods get money by mail. Amazing, eye-opening. Details free. Lexington Mail, 5538-B Lexington, Chicago 44.

EARN Money At Home With Your Typewriter! Spare time! Details free. Edwards, Publisher, 3915-PS, 12th, Des Moines 13, Iowa.

LEARN reweaving! Free Details. Frank Harris, 4333 South Carrollton, New Orleans, Louisiana.

SUCCESS Building Plans—Folios Show "How" to start a profitable home business—Write for literature. National, Box 88-Z, Dorchester 22, Mass.

CASH In on the mail-order bonanza! Book by successful operator of $100,000 business built in 3 years tells how. Satisfaction Guaranteed. Immediate Delivery. Send $1.00. Postpaid: Gardener Enterprises, P. O. Box 19693B, Chicago 90, Ill.

CAST Figurines! Novelties! Rubber molds! Dollar each! Castcraft, 508-S Marion St., Brooklyn 33, N. Y.

ELECTRICAL signs Exit, Fire, Escape, Men, Ladies, etc. Kelly Specialty, 5858 Washington, Chicago 44.

24 ASSORTED small unpainted figurines, $1.50 postpaid. Illustrated figurine list free. Oman, 642L Broadway, St. Paul 1, Minnesota.

WOULD You pay 3%—first $350 made? Book "505 Odd Successful Businesses" free! Work Home. Expect something odd! Pacific-PS, Oceanside, Calif.

BE Income Happy. New idea in mail selling. Free circular. S. L. Mallory, 266E South Court, Neillsville 5, Wisconsin.

SIMPLIFIED mathematics. Help market, share profits. Sample $1. Combs, 708 E. Haley, Santa Barbara, Calif.

MADE Big Money, So Can You. Wamsteker, Box 34-E, Wynberg, Cape, South Africa.

MAILING postcards selling repeat merchandise is profitable. Everything supplied. Details free. Gordon Publishers, Box 23, Pawtucket, R. I.

METALLIZING (Plating) Equipment, Supplies. Hard-to-Get Chemicals and Anodes. Complete assemblies for plating baby shoes, jewelry, novelties and industrial products; copper, bronze, gold, silver, nickel, chrome, etc. Home workshops to production shops priced from $79.95 complete. World's largest line of metal, onyx and marble mounts for bronzed baby shoes. Instructions furnished. Buy direct from manufacturer. Write for Free catalog and address of local branch. Hollywood Bronze Supply, Sales Dept., 1770 No. Vermont Avenue, Los Angeles 27, California.

BOOKKEEPERS earn $100.00 weekly operating simplified "Bookkeeping & Tax Service." Details Free. Universal Bookkeeping, Box 664-P, Springfield, Missouri.

SENSATIONAL Mail Order History In The Making! Literally, we've discovered a Workable Mail Order Gold-Mine. Free details on convincing proof, upon request. Co-operative Mail Service, PS-126 Lexington Avenue, New York 16.

$2,000 PROFIT 3 Weeks! No investment! Rare—Choice bit of Advertising "Know-How." Guaranteed legitimate. Instructions $1.00. New car? Debts? Grasp the opportunity now! Melvin P. Hawkins, Box 780-A1, Wilson, N. C. (Gift included may be key to your fortune).

HUNDREDS of products from one ¢ up. Free catalog. Z & Z, 1143 Manhattan Avenue, Brooklyn 22, New York.

57 MONEY MAKING OPPORTUNITIES

$5 HOUR Easy! Sell name plates for houses. Free Sample, order blanks. Write: National, 214 Summer, Boston, Mass.

LEARN Sewing Machine Repairing at home. Earn $125.00 week spare time. Plus, new machines, motors, etc. Wholesale. Free Particulars. Taylor Service Co., Hamilton, Ohio.

DETECTIVES Earn Big Money. Experience unnecessary. Detective Particulars free. Wagoner, P-125 West 86th, N. Y. 24.

SCHOOL Seniors — Earn sensational profits selling classmates America's Most Beautiful Graduation Name Cards. Largest selection. Outsells all others. Free sample kit. Printcraft Dept. P, 1425 E. Elm Street, Scranton 5, Pa.

QUICK profits taking magazine subscriptions, handling greeting cards. Cassell Publishers Service, Westfield, N. J.

PROFITABLE Home Business. Make fast-selling Easter, Mother's Day flowers, monkey trees, dolls. Literature free. Velva, Dept. X, Bohemia, N. Y.

CONVERT old light bulbs to profitable new use. Write now. F. A. Lewis, Box 104-S, Kensington Station, Brooklyn, New York.

A $100-A-Month hobby at home! No soliciting, no mail order, no meeting people. Easy enjoyable pastime. Details 25c (Refundable). Laura Dickson, 1006-PS Elizabeth Street, Anderson, S. C.

EARN Money At Home! Work mornings, afternoons free. Big Income possible. Details free. Chambers Enterprises, Box 871, Augusta 5, Georgia.

BIG Money, No Work, Just Fun, And No Cost. Free But Send A Few Stamps For Postage. Secretary, American Numismatic Company, 11655 Wagner Station, Los Angeles 47, California.

VENDING Machines, Punchboards. Free Catalog. Tyrcha Wholesale, 4532 N. Meade Avenue, Chicago 30, Ill.

EARN Money Evenings, copying and duplicating comic cartoons for advertisers. Adservice, Argyle 2, Wisconsin.

CASH For Box Tops, Labels, Wrappers, Coupons etc. Current List showing items wanted and Prices Paid 25c. Box Tops, 215 Wilson, 1-PS, Columbus 5, Ohio.

NEW Patented, Hobby-horse. It walks. It rocks. Exclusive territory. Manufacturing rights. Free details. Carl Markowski, Lewiston, Idaho.

UNPAINTED Novelties. Good Profits. List Free. Novelty Products, 146 Railroad St., Tiffin, Ohio.

BOOKKEEPERS: Earn up to $520 month part or full time serving small firms. Simplified System; Free Details. Tax Saver System, Dept. A, Fort Worth 2, Texas.

"EVERYBODY Likes Candy"—Learn to make professionally. (Our 40th year.) Ragsdale Candies, D10, East Orange, N. J.

$250 WEEK Reported! Free book "505 Odd Successful Businesses." Work home! Expect something odd! Pacific-E, Oceanside, California.

MONEY from Water, Salt and Air. Send $1.00 for copyrighted booklet. Box 1372, Des Moines 5, Iowa.

HOW You Can Make A Buck And Be Your Own Boss For $1.00. I'll answer your questions on Scrap, Salvage & Junk. Val's Yard, Bloomington, Wisconsin.

RAISE Cash: Start clean easy business at home. Wide selection kits, flowermaking supplies, crepe, wood fibre, chenille dolls, novelties. Finished flowers for agents. Crafts Catalog 10c. Clevemodel, 4507T3 Lorain, Cleveland 2, Ohio.

RAISE your business value, standing, as State Notary Public. Information, Stationers, Helotes 50, Texas.

58 FORMULAS, PLANS, ETC.

FORMULAS, trade secrets, for nearly everything. Catalog free. Creative Publishers, Winnetka 7, Illinois.

10,000 FORMULAS and Trade Secrets. Free Literature. Stillmans, 565 Kingston Ave., Brooklyn 3, N. Y.

LOW cost wiring, construction, radio plans, engineered to your specifications. Island Engineering Company, P. O. Box 263, Great Neck, L. I., New York.

FORMULAS—All kinds. Latest products. Literature free. Kemico, Park Ridge 15, Ill.

SYNTHETIC Detergents; 206 Expired Patents. $2. PatPub, Box 4094, Washington 15, D. C.

MAKE artificial gold. Instructions $1.00. Western Laboratories, 1124 East Apache St., Phoenix, Arizona.

LIQUID Auto Wax 200% Profit. Formula $1.—Plastics, Box 1574, Boston (4), Mass.

LABORATORY tested formulas. Lists free. Pont, Box 635-PS, Terre Haute, Ind.

MILLER'S Modern Manufacturing Formulas Make Products That Get The Business And Pay! Fifty years supplying the best. Literature Free! Miller, Chemist, Miller Building, Tampa, Florida.

59 PLASTICS

PLASTIC supplies, materials, instructions for hobby or business. Send for free catalog. Tells about internal carving, Hays Plastics, 1310 82nd Ave., Oakland, Calif.

NEW liquid plastic. Clear, colors. Cast without heat. Embed flowers, insects, coins. Saw, drill, carve. Free Folder, "Liquid Magic," shows fine things you can make and sell. Write today. Castolite, Dept. A-102, Woodstock, Illinois

INTERNAL carved roses, orchids, swans, goldfish, butterflies, etc. Jewelry and gifts. Crystal Floral Novelty Co., Bound Brook, New Jersey.

LUCITE, Plexiglas. Any size sheets, masked Square foot (12 x 12) cost 1/16", $1.10; ⅛", $1.43; 3/16", $1.75; ¼", $2.07. Colors add 10%, include 10% postage. Almac Plastics, 230 Fifth Avenue, New York 1, New York.

FREE sample plastic and three experiments. Learn plastics at home. Send 3c stamp to Plastic Projects, Box 5151-D, Detroit 35, Michigan.

LUMINESCENT Plastics, casting liquids, rods, sheets. Send 25c for list and samples. Storin Plastics, Box 324, Niagara Falls, New York.

PLASTIC Sheets, Rods, Tubes, etc. Free List. Plastic Supply Co., 2901 N. Grand Blvd., St. Louis 7, Mo.

PLASTIC letters for Signs, House Numbers, etc. Samples 25c. Plastic Exchange, Box 302, Bradenton 5, Fla.

LUCITE plexiglas, Acetate, 85 different colors, thicknesses. Immediate shipment from stock. Rod, Tube, Casting plastic. Wholesale, retail. Catalog, instructions, bargain lists, 10c. Gem-O-Lite, Box 686Y, North Hollywood, Calif.

HI-Profits. Internally Hand Carved Plastics. Gifts—Jewelry. Free Catalogue. Pilot Plastics, 67 B. Fulton St., N. Y. C. 7.

60 CHEMICALS AND APPARATUS

NEW Idea Chemical and Apparatus Outfits for Home Experimenting. Photo-Scales, Microscopes, Chemicals, Biological and Laboratory Supplies in Small Quantities. Catalog 15c. Established 1931. John H. Winn, 124-B West 23rd Street, New York 11, N. Y.

LABORATORY Apparatus, Chemicals, Microscopes, Complete Chemistry Sets, Minerals, Uranium Ore, 10c brings catalog. Porter Chemical Company, Hagerstown 2, Maryland.

ILLUSTRATED Catalog: Chemistry, mineralogy, biology, 10c. Tracey Laboratories, Evanston, Illinois.

LUMINOUS Paints will glow in dark. Six colors. Fairmount Chemical Co., 136 Liberty St., New York City 6.

LABORATORY chemicals and apparatus. New catalogue 10c. Luther Laboratories, New Britain, Connecticut.

URANIUM ore sample, weighing scale, catalog of chemicals, apparatus, kits, $1.00. Catalog only, 10c. Rex Laboratories, 2849-B Birchwood, Chicago 45, Illinois.

CHEMICALS and apparatus for industrial, analytical, and private laboratories. Catalog 15c. Dept. M-26, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N. Y.

OH Boy! New Book Of Science, Experiments, Formulas, Secret Processes, together with Catalogue of Laboratory Supplies. Only 25c. National Scientific Company, Dept. 15, 2204 W. North Avenue, Chicago 47, Illinois.

SAVE on supplies, chemicals Catalog 10c. Laboratory Sales, P.O. Box 161, Brighton, Massachusetts.

61 HELP WANTED

ALASKA—America's Frontier. $1.00 brings 1951 Business Directory, Large Government Map giving Up-To-Date Construction Projects, Current employment information, Homestead & Highway facts, Hunting-Fishing-Game Rules, Firms hiring & application forms, Alaska Opportunist, P.O. Box 883-S, Hollywood 28, Calif.

FOREIGN & Latin American Employment, 1951 "Foreign Service Directory" gives Up-To-Minute Facts on Military & Civilian Construction, Government Jobs, Major Oil Listings, Aviation, Transportation, Steamship Lines, Mining, Importers, Exporters, How-When-Where to apply, application forms, Hot List Firms Hiring, $1.00 post-paid. Global Reports, P.O. Box 883-S, Hollywood 28, Calif.

FOREIGN & Domestic Construction Projects, $1.00 brings Report published each month on World Wide Jobs in Canada, South America, Arabia, India, Africa, Alaska, How to apply & application forms, Jobs, P.O. Box 883-PX, Hollywood 28, Calif.

FOREIGN Employment. Construction men, building trades, mechanics, helpers, office men. Good workers interested in Foreign Development Projects. Pipe line, Dams, Power plants, Roadways, Shipping, oil refineries, etc. Transportation and quarters furnished; High wages. Listings of firms actively working on projects in Arabia, Persian Gulf, Africa, Alaska, Canada, South America, Europe, etc. Send $1.00 for Foreign Construction Compendium and Application forms. Foreign Service Bureau, Dept. PS-1 (Employment) P.O. Box 295, Metuchen, N. J.

$5 HOUR Easy! Sell name plates for houses. Free Sample, order blanks. Write: National, 214 Summer, Boston, Mass.

SAIL Ho! Be a merchant seaman! Enjoy world-wide travel, good pay. Free infor. State if any sea experience. Seaways B-47, Old Chelsea Sta., N. Y. C. 11.

SELL home photo-copy kit. Copy anything, 30 seconds. Dollar brings demonstration kit. Wentworth Co., 1112 N W 18th Pl., Miami, Fla.

CONSTRUCTION Workers: Want to make better jobs? Longer jobs? Latest information. Jobs breaking. Jobs underway. North, South, East, West. The best. Big job list. Accurate. Up to date. Send one dollar. Dempster's Construction Scout News, Dept. 268-DA, Bridgeport, Ill.

SELL Printed Job Application Forms. 3 Dimes bring 6. Standard Forms. Box 3980, Miami 25, Florida.

SELL Foreign-Domestic Project Directory, Copy and Application Form: Dollar (COD—$1.32). Foreign Service, Box 3980, Miami, Florida.

63 AGENTS WANTED

FREE Complete Sales Kit. Sell personal initialed belts and buckles, cap badges, tie holders, etc. Choice of 2000 emblems. Write for free selling outfit today. Hook-Fast, Box 1425PS, Providence, Rhode Island.

$5 HOUR Easy! Sell name plates for houses. Free Sample, order blanks. Write: National, 214 Summer, Boston, Mass.

WHERE To Buy $00.000 articles direct from Manufacturers. Save by buying direct. Sent Free. "Your Profits Under the Spotlight." Glass Pub. Co., Ellwood City 3, Pennsylvania.

COMMERCIAL Deep Frying Course. Mock Chicken Legs, Potatoes, New and proven methods. Learn about this money-making field. $2.50. PP. Concession, Toledo 13, Ohio.

NEW Jobs open in selling! Send name, address for five free issues of Opportunity Magazine's money-making guide, listing hundreds of companies who'll pay you well, full or part-time. No experience needed. Opportunity, 28 E. Jackson, Dept. 18, Chicago 4, Illinois.

DRESSES 18c; Coats $1.00; Blouses 35c; Free Catalog; Crown, 164-PB, Monroe St., New York 2.

SCHOOL Seniors! A postal will bring you our wonder, Kwick-Sell Cardalog of popular Graduation Name Cards. Biggest profits! Only firm giving free Golden Memory Book and Souvenir Chest. Don't miss out. Hurry that postal! Craftcards, Box 235 (m), Pittsburgh 30, Pa.

AGENTS—300% profit selling genuine gold window letters; stores and offices. Free samples. Metallic Letter Co., 437 N. Clark, Chicago.

AGENTS—Big Line Including Food Products. Fast selling premium and bargain deals. Low prices. Send card for big outfit offer with gift. Ro-Ro-Co., 2771 Dodier, St. Louis 7, Mo.

NYLON, Poplin, Rayon Uniforms, white and colors. Immediate Delivery. Immediate Profits. Sell to Doctors, Dentists, Nurses, Waitresses, Beauticians, Housewives. Free Sales Kit. Superior Fabrics, Dept. A-1, 3936 Market St., Phila. 4, Pa.

START Your Own Business on credit. Always your own boss. 1559 Dealers sold $5,000 to $28,000 in 1949; their average $6,834. We supply stocks, equipment on credit. 200 home necessities. Selling experience unnecessary to start. Wonderful opportunity to own pleasant profitable business backed by world-wide industry. Write Rawleigh's, Dept. A-U-PSC, Freeport, Ill.

GOLD lacquered Window Sign Letters. Large Sizes Penny Each. New foils. Absolutely Beautiful. Free Samples. Atlas, 544 W. 79th, Chicago 20.

FAST profits—No investment. Send for big, free catalog. Plastic aprons, tablecloths, etc, 150 sure-fire items. We guarantee sales. Write The Halliday Co., Dept. P, 15-19 Pennington Ave., Passaic, N. J.

OUR Agents Make Big Money selling all-occasion greeting cards. Terrific box of 21 only $1.00. Over 75 other boxes. Profits to 100% plus bonus. Free samples. Kit on approval. Regal Greetings, Hazel Park 27, Michigan.

BE A Money Maker . . . Use your home as magazine headquarters. Liberal commissions. No experience—No capital needed. Everything furnished. Write for Free Catalog. McGregor Magazine Agency, Dept. 510A, Mount Morris, Ill.

NO experience needed to make money fast for yourself or organization. Sell gorgeous new All-Occasion assortments. 21 cards $1.00. Valentines, Easter Cards, Religious, Novelties, unusual gifts, Scented Stationery, Notes, Wrappings. Over 100 items. "Get Started" plan. Write for samples on approval. Hedenkamp, 361 Broadway, Dept. PS-10, New York.

PHOTO-Salesmen-Agents. Sell beautiful hand colored plastic enlargements and sensational new photo compacts, rings, bracelets, lockets, etc. Collect deposit, we deliver. Profitable sideline. Send card, for Free sample kit. Novel Portrait Co., 3343-A North Ave., Chicago, Ill.

TREMENDOUS Profits Selling Sunshine Cards. America's most distinctive Greeting Card Line. Amazing values. 21 Everyday Cards with lined envelopes. Bonnie Notes. Clever Comics Assortment. Gift Wraps. Stationery. Napkins, plus many more top items. Act Now! Write for Sample Kit on approval. Sunshine Art Studios, Dept. PS-1, 115 Fulton Street, New York 8, New York.

FREE sample nylon stocking of world's only nationally advertised hosiery line actually guaranteed against runs, snags or excessive wear, regardless of cause! It's amazing but true. Every weight from sheerest 15 denier to heavy 70 denier—all gauges to luxury 60 gauge. Amazingly low prices, starting at $1.08 prepaid for sheerest 15 denier 51 gauge. Not sold in stores. Good Housekeeping Guarantee Seal. Also complete line men's hosiery guaranteed one full year or replaced free. Full variety lingerie in crepe, satin and nylon, featuring all nylon slip at $2.95, satin slip at $1.58, etc. Housecoats and robes. Kendex sales people will earn one million dollars this year. Get your share. No money or experience needed. Pay nothing now or later. Just show free outfits. Write orders. We deliver and collect. Advance cash plus huge bonus. Earn money spare or full time. Become manager—appoint others to sell for you—earn steady income on their sales. Man or woman—young or old, you can earn more money than you ever thought possible. Everything you need is furnished free and prepaid, including nylon stocking, samples of materials, sales books, 36-page salesmanual, color cards, etc. Simply write your name and address on postcard and mail to Kendex Corporation, Babylon 14, N. Y.

JEWELRY For Salesmen Distributors Direct Factory, Catalog Free. Pickcraft (c 19) Bank St., Attleboro, Mass.

IS $210. a week worth a penny postcard to you? Then rush card with name and address for special Free Trial Plan that sells amazing new Automatic Refrigerator Defroster "like hot cakes!" Write to Mr. Lewis, D-Frost-O-Matic Corp., Dept. PSC-1, 6 N. Michigan, Chicago 2, Ill.

A PENNY Post Card Can Put You In Business. Complete line, Leather jackets, 151 shoe styles. Big commissions. No experience, no investment. Send penny post card for Free outfit. Consolidated Shoe System, Dept. S-111, Chippewa Fall, Wisc.

MAKE Perfume—Big Profits—Mailorder—Expect Secrets—Write "Imsco", 6347 Parnell-PA-1, Chicago 21, Illinois.

WIN real cash. Even beginners make handsome profits selling new 21 for $1.00, 3-dimension Everyday greeting card assortments, Novelties, gift wraps, household items. Free samples Imprinted Stationery, Napkins, Notes, Deluxe All-Occasion samples on approval. Bonus, Special offers. Write Pilgrim Greetings, 111 Summer, Dept. AO-6, Boston, Mass.

WOMEN Who Can Sew And Alter dresses, make extra money part time taking orders for big manufacturer. All sizes. Amazing values. Everything furnished. Harford Frocks, Dept. D-235, Cincinnati 25, Ohio.

FREE SAMPLES. Big profits showing amazing Glow-in-the-Dark specialties. House numbers, pictures, plastic novelties, ashtrays, keyholders, religious and nursery objects, etc. Madison Plastics, 303 Fourth Ave., New York 10, N. Y.

"FOG-STOP" Windshield Cloth. Instantly removes blurry Mist, Frost, Sleet, Snow. Stops windshield fogging. Samples sent on trial. Kristee 122, Akron, Ohio.

ABSOLUTELY Free! Big package actual sample fabrics and style presentation of dresses, lingerie, hosiery, etc. Take orders. Commissions big. Send no money. Melville Co., Dept. 7006, Cincinnati 3, Ohio.

CARBURETOR Too Rich Makes Motorist Too Poor. New invention saves gas "Vacumating." For free particulars, sample offer, write Vacumatic, Dept. 6, Wauwatosa, Wis.

NEW "Sponge" Wall Cleaner. Erases dirt like magic. Wallpaper, painted walls, ceilings. Saves redecorating. Lightning seller. Samples sent on trial. Kristee 121, Akron, Ohio.

BRAND New! Amazingly different and smart Everyday Cards. 21 for $1 Magic Window Designs. Take Easy orders. Make up to 100% Cash Profit. Big line $1 Assortments, Personal Stationery, Imprinted Matches, Free Imprint Samples. Assortments on Approval. North Star, 31 Glenwood, Dept. P-19, Minneapolis, Minn.

YOURS for free trial—everything you need to make extra money! Experience unnecessary. Big profits. Bonus. Request Feature All-Occasion greeting card assortments on approval, free samples Name Imprinted Stationery, Napkins, Towels, free Catalog, Selling Guide and Surprise Gift Offer. New England Art Publishers, North Abington 416B, Mass.

GREETING Card moneymakers. Valentine, Easter, Birthday. Greenport Art Company, Dept. C-116, Brooklyn 15, N. Y.

GREETING card salespeople. $50 without risk. Sell America's leading 21 card. Everyday Boxes—samples on approval. Amazing newest gift items. Free samples. 150 for $1.00 Personalized Stationery. Write today. Lorain Art Studios, Dept. J-45, Vermilion, Ohio.

BIG Profits. No investment. Selling business cards. Write: Slifman, 1675 Park Place, Brooklyn 33, N. Y.

Just Out! New Thrilling sensation in Everyday Cards. Rich foils, satins, velours sell on sight. 21 for $1. Make up to 100% profit. 50 Assortments, Imprint Stationery and Book Matches, Gift Items. Two $1 Assortments on approval. Imprints Free! Joy Greetings, 507 N. Cardinal, Dept. F-61, St. Louis, Mo.

TAKE Large Unit Orders With Wool And Cotton Uniforms, Initial Buckles, Belts, Badges, Choice 3,000 Emblems. Prospects Everywhere. Write Hook-Fast, Box 480-PS, Roanoke, Va.

AT Last! Something New and Sensational in Everyday Cards. 21 for $1. Make Extra Money Fast. Show Satin, Velour, Metallic Cards. Get orders easy. Big line $1 Assortments, Scented Stationery, Personal Matches, Kiddie Books, Imprints Free. Two $1 boxes On Approval. Puro Co., 2801 Locust, Dept. 141-A, St. Louis 3, Mo.

MAKE Money Calling On Friends! Show nationally advertised Greeting Card Assortments—new All-Occasion Assortment and laugh-packed Barrel-of-Fun Assortment. Sells for $1.00—up to 50c profit for you! Also Personal Notes, Gift Wrappings, Stationery, Gift Items, others! Get Two assortments on approval. Write Wallace Brown, 225 Fifth Ave., Dept. R-4, New York 10.

MEXICAN feather pictures. Sell on sight; 200% profit! Free details; sample 10c stamps. Sylvia-81, Apartado 9036, Mexico City.

AMAZING New Way to Earn Money Quickly and Easily with Gifts, Stationery, Cards. No Experience Necessary. Send Now for Free Home Demonstrator and All Else Needed. 2 Best Sellers on Approval. Terry Studios, 500 Westfield, Mass.

SELL Du Pont Nylon Uniforms. Complete line famous exclusive Hoover Styled nylon uniforms for beauty shops, nurses, doctors, waitresses, others. Best quality, splendid values. Exceptional income. Real future. Equipment free. Write fully. Hoover, Dept. K-101, New York 11, N. Y.

EXTRA cash—easy! Sell friends newest design 21 for $1.00. Dark Card. Novelty All-Occasion greeting card assortment. Gift Wraps. Animated Books. Profits to 50c per $1.00 box. Special offers. Bonus. Prompt Service. Experience unnecessary. Write today for free samples Name Imprinted Scented Stationery, Napkins, Book Matches, feature assortments on approval, free catalog, selling plans. Elmira Greeting Card Co., 2110 Elmira, New York.

AMAZING discovery. Master Glaze, puts brilliant glass-like surface on cars. Free Sample, information. Big commissions. Master Glaze, Dept. 708, 7720 Harwood, Milwaukee, Wisc.

DO you need money? $40.00 is yours for selling only 50 boxes of our 200 Greeting Card line. And this can be done in a single day. Free samples. Other leading boxes on approval. Many surprise items. Experience unnecessary. Free samples Personalized Stationery, Napkins. Write today. It costs nothing to try. Cheerful Card Co., 64 White Plains, N. Y.

SELL Big Money-Maker to Men and Women. Easy handwork makes fast-selling useful articles. Sample free. Sunmads Company, Brockton 64, Mass.

BUY thousands of nationally advertised products direct from manufacturers and distributors. Write for "Buy Direct and Save." Service Publishing, 1420-B Investment Bldg., Pittsburgh 22, Pa.

UP to $50.00 in a week and tailored suit for yourself without paying one cent. Write for plan. J. C. Field & Son, Dept. N-1720, Harrison and Throop Sts., Chicago 7, Illinois.

SELL New Automatic Floor Waxer, Trigger on Handle. Hands never touch Floors or Wax. Retails $2.95. Profit 125%. Write Smith, Inc., Greenfield 16, Mass.

FACTORY Representatives. Power mowers. Appoint dealers. Liberal commission. State territory. Rotacut, RC-2001, Excelsior Springs, Missouri.

WIN Suits And Earn Money! Both easy with amazing plan. Show finest made-to-measure tailoring to friends, neighbors. No experience or investment. Free outfit. Write Progress Tailoring, Dept. N-221, Congress & Throop, Chicago 7, Ill.

BIG Profits on Plastics! Sell proven hits in plastic tablecloths, aprons, drapes, garment bags, utility covers. Highest quality, lowest prices! Free catalog SM 11. Acclaim Products, 33 Sherman Ave., New York 34, N. Y.

SELL $2 Fire Extinguishers. Locally, mailorder. Lorrac Products, Albany 1, N.Y.

SELL!! Balloons, Combs, Specialty Merchandise. Carleton House Distributors, Texas City, Texas.

NYLONS Direct from Factory. Sample Free. Guaranteed against runs. No experience or money needed. Earn big money on spare or full time selling Nylon Slips, Panties, Men's Hose, Gold Neckchains, Religious Medals. Become Manager, appoint agents. We pay you 40c for every $1 your agents earn. Ergim Company, 992 Columbus Ave., New York.

MAKE $4.00 Cash On New $10.00 Home Kit. We Deliver. Sample $5.00. Sibert Company, Newark 3, New Jersey.

FREE Literature—Thousands Wholesale supply sources. Moneymaking Business ideas. Wilkin Company, Hillsboro 2, Ohio.

WOULD You pay 3%—first $350 made? Book "505 Odd Successful Businesses" free! Work Home. Expect something odd! Pacific-PS, Oceanside, Calif.

ADVERTISING book matches—Cash in on big demand—sell Union Label matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash commissions. Superior Match Co., Dept. P-151, 7530 Greenwood, Chicago.

$1 STARTS you in business. Sell fine $1 ties. $1.50 and up values only $7.20 dozen, you make $4.80. Send only $1 for 2 sample ties. Catalog free. Philip's Neckwear, Dept. 716, 20 West 22nd Street, New York 10.

FREE! Let me send you food and household products to test in your home. Tell your friends, make money. Rush name. Zanol, Dept. 9091-A Richmond St., Cincinnati 3, Ohio.

63 HIGHGRADE SALESMEN

$5 HOUR Easy! Sell name plates for houses. Free Sample, order blanks. Write: National, 214 Summer, Boston, Mass.

BIG Money Taking Orders: shirts, ties, sox, pants, jackets, sweaters, shoes, uniforms, etc. Sales equipment free. Experience unnecessary. Nimrod, 4922-AV Lincoln, Chicago.

FREE Sample & information. Sensational new sports article. Nelson Company, Dept. G, St. Paul 2, Minnesota.

SALESMEN—One of America's Finest Tools For Mechanics. Full information Free—Frayn Company, Redwood City, Calif.

MAKE Money with famous, easy-selling Bostonian shirts, spare time, full time, sideline. Fabrics, outfit Free. Bostonian, 89 Bickford, Dept. B-11, Boston 30, Mass.

AD Matches! Sell Amazing Designs—20, 30, 40 and 240-light book matches. Big spot cash commissions; every business a prospect. Low prices for high quality. Repeats. Start without experience; men, women; full, part time. Buy Nothing! Sales kit furnished. Match Corp., Dept. PS-13, Chicago 32, Illinois.

EARN Big Money Fast! Sell finest-quality advertising work uniforms to garages, factories, filling stations, etc. Free selling kit. Topps, Dept. 541, Rochester, Indiana.

RICH Opportunity for Men in Their 50's. Healthful, pleasant occupation. No investment needed. 150 of our men made $500 to $3,000 in one month; many just beginners. Heckman made $104 first 2 hours; Crowley made $224 first day; exceptional earnings. Openings available. Write President, Dept. PS, Fort Worth 1, Texas. (If you live in Canada write: President, 25 Industrial St., Dept. PS, Leaside, (Toronto) Ontario.)

WANT to make real money? You can positively make $50.00 a day and up selling a brand new item going to every type of food and beverage store, factories, Laboratories, Hospitals, etc. First time advertised. Write for Free Details today. Johnson-Hartman, 53 West Jackson Blvd., Dept. PS-1, Chicago 4, Illinois.

67 EDUCATIONAL AND INSTRUCTION

LOGARITHMS Simplified. The dollar book that tells how logarithms save time and obtain accuracy in mathematical work. Written for students, shop men and others. Page Publications, McFarland, Wisconsin.

USED Correspondence Courses and Books sold and rented. Money back guarantee. Catalog free. (Courses Bought). Lee Mountain, Pisgah, Alabama.

LEARN Piano Tuning, Repairing—at home in 30 days. Unlimited income. Phonograph recordings, tools and instructions furnished. Write Capitol City Tuning School, Department C-133, 120 East Michigan, Lansing 16, Michigan.

BOOKKEEPERS! Increase your earnings! Operate your own simplified "Dollar-A-Week" Bookkeeping and Tax Service. Full or spare time. Details Free. No obligation. Ellis, Box 203, Cedar Grove, North Carolina.

MEDICAL Laboratory Technicians in great demand. We train you in your own home. Catalogue free. Imperial Technical Institute, Box 973-B, Austin, Texas.

BECOME a Doctor of Psychology or Metaphysics. Teach secret of contentment, happiness. Win degree of PsD. or MsD. Solve mental worries. Free book. College of Universal Truth, 5153-K N. Clark, Chicago.

MAKE Up To $35-$45 Week as a Trained Practical Nurse! Learn quickly at home. Booklet free. Chicago School of Nursing, Dept. M-1, Chicago.

PIANO Tuning Pays. Learn this profitable profession at home. Our Tonometer and mechanical aids make learning easy. No knowledge music necessary. Diploma granted. Largest and oldest school—51st year. G. I. Approved. Write for booklet. Niles Bryant School, 77 Bryant Bldg., Washington 16, D. C.

WHY Don't You Write? Writing short stories, articles, etc., will enable you to earn extra money. In your spare time we teach you to write the way newspaper men learn—by writing. Free "Writing Aptitude Test" tells whether you possess the fundamental qualities essential to successful writing. Veterans! This Course Approved for Veterans' Training. Write today! Newspaper Institute of America, Suite 5861-A, One Park Ave., New York 16, N. Y.

AIRBRUSH Art. Home Study. Free Catalog. 117-F East 60th, N. Y. C.

HOME Study. Drugless Therapy, Psychology, Philosophy Degs. Western University, 3693 5th Avenue, San Diego, Calif.

1951 CIVIL Service Jobs! Start high as $3,450.00 year. Secure positions. Men—Women. Quality Now for many expected openings. Experience usually unnecessary. Free 40-page book shows jobs, salaries, sample tests. Write today: Franklin Institute, Dept. N-22, Rochester, N. Y.

WELDING training pays at Hobart Welding School. Box P-113, Troy, Ohio. VA Contract. Best equipment. Catalog Free.

SELF-HYPNOSIS. Infallible method! $1.00. Hampton, 3121 Hamilton Way, Los Angeles 26, California.

EARN While You Learn. Day or Night Classes. Through courses in: Automobile Mechanics, Diesel Mechanics, Motor Tune-Up, Auto Body and Fender, Welding, Refrigeration, Radio, Etc. Living accommodations. Draw $200 to $290 per month while in school. Fully Accredited to Train Veterans. Thirty-two Years' Experience Training Men. Nashville Technical College, Dept. #251, Y.M.C.A. Bldg., Nashville 3, Tennessee.

AMAZING new scientific way to remember. Free Details. H. Kaye, P.O. Box 261, S. I. #1, New York.

READ 100% Faster! New Amazing Method. Save time. Learn more. Earn more! Free home test. Speed-Reading, 9111-M Hoyne, Chicago 20.

USED Correspondence Courses and Educational Books Bought, Sold, Rented. Catalog Free. Educational Exchange, Summerville, Georgia.

SHOE repair offers big income. Learned by doing; ages 18-60. Free illustrated book tells how. Write Modern Shoe Rebuilding School, B-806 S. Figueroa, Los Angeles.

"YOGI"—Amazing secrets from India! Authentic, sincere, personalized instructions. Sincere seekers only! Yoga Psycho-Logic Institute, 1508 Irving, San Francisco, California.

ACHIEVE business and financial success in your own Collection-Credit Agency business. Home or office. Quickly learned. Free folder. Write Cole & Associates, Syracuse 2, N. Y.

68 DANCE INSTRUCTION

SQUARE Dance—Instructions—Calls, 25 Sets. $1.00. Rayburn Books, Eureka Springs 9, Arkansas.

69 CONTESTS

WIN Cash, Cars in Prize Contests! Write for copy filled with current contests, winning hints and tips. Send only 25c. Wright Contest Digest, Dept. 20-A, P. O. Box 2266, St. Louis 9, Missouri.

CONTESTANTS! We Help. United Puzzlers, 13-A Earl, Red Bank, N. J.

70 LANGUAGE OUTFITS

IT'S Fun Learning a Language by Linguaphone. At home, in leisure time, quickly, easily, correctly master Spanish, French, Italian—any one of 29 languages through proven Linguaphone conversational method. Send for free book. Linguaphone Institute, 5401 Rockefeller Plaza, N. Y. C.

72 AUTHORS SERVICE

I WANT New Writers to cash checks of $1 to $100 offered daily. The easiest way to write for pay. No previous experience necessary. Free Details. Saunders M. Cummings, 468-15 Independence Bldg., Colorado Springs, Colo.

74 CARTOONING, SIGN PAINTING, DRAWING AIDS

"HOW To Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is free; no obligation. Simply address Cartoonists' Exchange, Dept. 191-C, Pleasant Hill, Ohio.

CARTOON Your Way To Success! Internationally known instructor, Raye Burns, will personally teach you to create salable, original cartoons at home. Course of 26 lessons only $2.85. Send remittance with order or write for Free Details and addresses of successful students. Raye Burns School, Box 3583-S, Cleveland 18, Ohio.

UP To $4.50 an hour, spare time, if you can do small, simple lettering. Details Free. National Artists, Dept. 3, 801 North Marsalis, Dallas 8, Texas.

BARGAINS. Quick Landscape Painting. Poster Art-Lettering, Art Lessons. Catalog 10c. Art Book Shop, Arnold 5K, Missouri.

SIGN painting taught at home. Test lesson free. Ben Kerns, Box 812-PS, Greenville, S. C.

LEARN Sign painting. 152 Lesson Course. Results Guaranteed. Stewart Sign Co., Box 287M, Pasadena, California.

75 CHALK TALK-STUNTS

CHALK Talks. Laugh Producing Program. $1.00. Illustrated Catalog 10c. Cartoonist Balda, Oshkosh, Wisconsin.

76 TYPEWRITERS AND OFFICE MACHINES

PRINTOMATIC selffeeding Post Card printing Duplicator $13.50. Envelope Addressing Machines $24.50. Pittsburgh Typewriter Company, 336-G Fourth Avenue, Pittsburgh 22, Pa.

RECONDITIONED Typewriter office machines. Bargains. Write Dixie Service, King, N. Carolina.

78 RUBBER STAMPS

READY made stamps. Free list. Criterion, Box 2326, Denver 25, Colo.

3 LINES 50c: pads 35c: Signature $2. Seals! Printright, Waunatosa, Wis.

79 PRINTING OUTFITS, SUPPLIES

PRINT your own cards, stationery, circulars, advertising. Save money. Simple rules. Print for others, nice profit. Raised printing like engraving too. Have home shop. Details free. Kelsey Presses, L-8, Meriden, Connecticut.

PRESSES, Type, Supplies Lists 5c. LaGarza, 98 Pleasant, Cambridge 39, Mass.

PRESSES $20.00 up. Catalog 10c. Printers Supply, 211-S, Springfield, Missouri.

PRINT Your Own Post Cards, at home or office, with the Gem Stencil Duplicator. Economical. Easy to use. Write for Free Trial—Send no money. Use for 10 days. Then send only $8.50 for Gem outfit and all supplies, or return to us; no questions asked. Bond Equipment Company, Dept. C1, 6633 Enright, St. Louis 5, Mo.

MAKE Your Own printing cuts. Seifmolding process. Plexirubber, Argyle 2, Wis.

PRINTING Presses, Type Supplies, Lists 3c. Turnbaugh Service, Loysville, Penna.

80 PRINTING, MULTIGRAPHING, ETC.

PHOTO-Offset Special: 5000—8½x11 $14. Samples Free. Reiffe, 160-S Monroe St., New York 2.

1000 BUSINESS Cards $2.50 Prepaid samples Free. Reliable Print Shop, 905 East Jefferson, Louisville 6, Ky.

1000 ATTRACTIVE embossed business cards; $3.50. Balto. House, Box 951, Baltimore, Maryland.

BUSINESS Printing, Samples, Prices Free. Howprint, 723-S Eunice, Webster Groves 19, Missouri.

MIMEOGRAPHING, Letterheads, letters, envelopes. Martin Service, 3212 Harper, Saint Louis, Missouri.

GUMMED Labels, Cards, Stationery. List free. Box PS-135, Spiro, Okla.

WHOLESALE Printing! 1,000 8½x11 Photo-offset, $5.50. Lists, samples 10c (refundable). Acme, Covington 5, Virginia.

BUSINESS Stationery. Low cost. Samples. Mero Products, 99 Morrison, Punxsutawney, Penna.

OFFSET Printing. Mimeo Prices! Samples. Athens, 2816-E Vaughn, Fort Worth 5, Texas.

100 LETTERHEADS (8½x11 Hammermill) $1.00 Postpaid. Envelopes same. Race Printing, Hudson, New York.

500 LETTERHEADS, Envelopes or Billheads, $3.00. Gibson, 10 So. 2nd Street, Camden 3, New Jersey.

1000 SIMULATED engraved business cards $3.00 postpaid. Choice 24 types layouts. Immediate delivery. Free samples. ABC, 728 West Peachtree, Atlanta, Ga.

82 PATENT ATTORNEYS

INVENTORS: Learn how to protect your invention. Unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and prepared to serve you in handling your patent matters. "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure with "Record of Invention" form will be forwarded to you upon request—without obligation. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 12B-A District National Building, Washington, D. C.

INVENTORS: Write for free brochure "Evidence of Invention." Labiner, World Building, New York 7.

PATENT practice before U. S. Patent Office. Validity and infringement investigations and opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommel, Registered Patent Attorneys, Suite 413, 815—15th St. N.W., Washington 5, D. C.

C. A. Snow & Co.—S-427. Snow Building, Washington 1, D. C. Registered Patent Attorneys. Write for information.

INVENTORS: When you are satisfied that you have invented something of value write me, without obligation, for information as to what steps you should take to secure a Patent. Write Patrick D. Beavers (Formerly Randolph & Beavers) Registered Patent Atty., 938 Columbian Bldg., Washington 1, D. C.

INVENTOR'S Guide free on request. Frank Ledermann, Registered Patent Attorney, 154 Nassau St., New York 7.

INVENTORS. For "Record of Invention" form, contact Carl Miller, Registered Patent Attorney, Woolworth Building, New York.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent. John N. Randolph, Registered Patent Attorney, 207 Columbian Bldg., Washington 1, D. C.

INVENTORS—If you consider your invention to be something of importance, take steps to protect it with a United States Patent which gives you the right to exclude others from asking, using and selling your invention as claimed. "Patent Protection for Inventors" outlines steps to take to secure patent protection. Mailed promptly without obligation. Victor J. Evans & Co., Merlin M. Evans, Registered Patent Attorney, 641-A Merlin Building, Washington 6, D. C.

INVENTORS—If you believe you have an invention, you should find out how to protect it. The firm of McMorrow, Berman & Davidson with offices in Washington, D. C., is qualified to take the necessary steps for you. Send for copy of our Patent Booklet "How to Protect Your Invention." We will also send you an "Invention Record" form. No obligation. They are yours for the asking. McMorrow, Berman & Davidson, Registered Patent Attorneys, 143-E Victor Building, Washington 1, D. C.

PATENTS—Irving L. McCathran, 316 McLachlen Bldg., Washington 1, D. C. Registered Patent Attorney.

REGISTERED Patent Attorney offers services. Sanders, 6430 Evans, Chicago 37, Illinois.

83 FOR INVENTORS

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent on your invention. John N. Randolph, Registered Patent Attorney, 206 Columbian Bldg., Washington 1, D. C.

INVENTORS. For "Record of Invention" form, contact Carl Miller, Registered Patent Attorney, Woolworth Building, New York.

SEARCHES—Put your patent searches in the hands of a Registered Patent Attorney or Agent, as he qualifies to give a worthwhile patentability report. Record of Invention form upon request and information on patent protection. Patrick D. Beavers, Registered Patent Attorney, 939 Columbian Bldg., Washington 1, D. C.

INVENTORS: Learn how to protect your invention. Unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and prepared to serve you in handling your patent matters. "Patent Guide for the Inventor" containing detailed information concerning patent protection and procedure with "Record of Invention" form will be forwarded to you upon request—without obligation. Clarence A. O'Brien & Harvey Jacobson, Registered Patent Attorneys, 12A-A District National Building, Washington, D. C.

PATENT Protection—This well-known organization will send you promptly upon request and without obligation, a booklet containing detailed information concerning steps to take to protect your invention by a United States Patent. Victor J. Evans & Co., Merlin M. Evans, Registered Patent Attorney, 642-A Merlin Building, Washington 6, D. C.

INVENTORS—If you believe you have an invention, you should find out how to protect it. The firm of McMorrow, Berman & Davidson with offices in Washington, D. C., is qualified to take the necessary steps for you. Send for copy of our Patent Booklet "How to Protect Your Invention." We will also send you an "Invention Record" form. No obligation. They are yours for the asking. McMorrow, Berman & Davidson, Registered Patent Attorneys, 143-D Victor Building, Washington 1, D. C.

ACTION—Action—Action: Inventors with patented and patent pending inventions for sale or lease request Free book. No obligation. Dept. 2-P, U. S. Patent Exchange, 239 Hellman Bldg., Los Angeles 13, Calif.

PATENT searches $5.00, including patent copies. We offer you same reliable search as conducted for patent attorneys. Free protection forms, 48 hour service. Patent Service Institute, 945-B Pennsylvania Avenue, Washington 4, D. C.

CASH For your idea. 280 manufacturers need inventions, patented or unpatented. List free. Invention Bureau, 208-S Clinton, Oak Park, Illinois.

COMPLETE Services for inventors: Patent searches, Specifications prepared, Invention marketing, Protection forms free. Industrial Patent Reports, Box 1081, Massachusetts, and North Capitol, Washington 13, D. C.

INVENTORS: Let profits pay for your patents. Write for details today. No obligation. International Patent Library, 1420 New York Avenue, Washington 5, D. C.

INVENTORS: If you have an invention for sale, patented or unpatented, write Institute of American Inventors, Dept. 30A, 631-E St., N.W., Washington 6, D. C.

INVENTORS sell your patents quickly with minimum expense. "Short Cuts to Patent Sales" tells how. Prepared from years of experience. $1.00 postpaid. Return privilege if not pleased. Jennings Bros., 118 Naples St., San Francisco 12.

PATENT Searches by former Patent Office Examiners $5.00. 48-hour service. Protection forms free. Write Patent Engineering Service, 1404 New York Avenue, Washington 5, D. C.

INVENTORS—Confidential Engineering and Drafting Help Now Available—Very Reasonable Rates—Free Booklet—Machine Design Service, 416 Madison Avenue, Rahway, New Jersey.

84 INVENTIONS WANTED

INVENTORS—What have you, patented, unpatented to offer manufacturers? Request free booklet without obligation. Market Contacting & Data Service, 11106-B2 Longwood, Chicago 43.

CASH For your idea. 280 manufacturers need inventions, patented or unpatented. List free. Invention Bureau, 208-S Clinton, Oak Park, Illinois.

INVENTIONS Promoted, Patented or Unpatented. Write Adam Fisher Company, 183-A Enright, St. Louis, Mo.

ACTION—Action—Action. Free book to inventors with patents and patent pending inventions for sale or lease. No obligation. Dept. 2-W, U. S. Patent Exchange, 239 Hellman Building, Los Angeles 13, Calif.

INVENTIONS Wanted, Patented or Pending only. Inventors Exchange-D, Hartford 1, Conn.

CASH In On Your Ideas. We have Many Reputable Manufacturers Seeking New Products. Full Protection For You. Save Time. Give Complete Details In Your Letter. Free "Inventors Guide." Inventors Creative Service, 326-PS West 3rd Street, Los Angeles 13, Calif.

INVENTORS: Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information, free. Institute of American Inventors, Dept. 30C, 631—E Street, N.W., Washington 4, D. C.

85 PATENTS

INVENTORS: Test the commercial value of your patented or unpatented inventions, quickly and inexpensively. Write for free information. Institute of American Inventors, Dept. 30-B, 631-E St., N. W., Washington 6, D. C.

89 MODELS, MODEL SUPPLIES

SHIP and Yacht model fittings; blueprints. Send 25c for illustrated catalog No. 26—Listing hundreds of items. A. J. Fisher, 1002-2 Etowah, Royal Oak, Mich.

BUILD Historic ship models, complete kits, 39c to $9. Catalog 15c. Ideal Models, 21 West 18th, New York 11, N. Y.

POWER Models, Unusual steam, gasoline and traction engines, Metals, tools, accessories. Catalog 50c. Charles Cole, Ventura, Calif.

SHIP Model and yacht supplies, complete large 64 page catalogue, 30c. Wm. Wild, 510 E. 11th St., New York City.

SHIP Models—most complete line in New England. Kits, parts, plans, books, tools, Engines and motors. Illustrated catalog, 25c. James Bliss & Co., Inc., 220 State St., Boston, Mass.

PRIME kits and fittings for sail, steam and diesel. Send 25c for useful 1951 catalog. Model Shipways, Folio 44, 476 Main Street, Fort Lee, N. J.

STEAM engines, boilers, castings. Catalog 25c. Anton Bohaboy, 2297 Price, Rahway, New Jersey.

91 HOME CRAFTSMEN

LEATHERCRAFT. Everything needed by beginners, advanced hobbyists and professional leatherworkers. Largest stock of supplies in U. S. Moderate-priced tooling leathers, top quality calfskins, tools, supplies, kits. Send 10c for Big Catalog. J. C. Larson Co., 820 S. Tripp, Dept. 676, Chicago 24.

VIOLINMAKERS: Amateurs — Professionals. Fine tone European wood, materials, supplies. Illustrated catalogue 10c, refunded. Premier Violin Supplies, 430 S. Broadway, Los Angeles 13, Calif.

90 ALL new, full size lawn ornament and novelty patterns, up to 30" high. Only $1.00. Mastercraft 128, 7041 Olcott, Chicago 31, Illinois.

LEATHER, tools, lacing, supplies. Free Catalog. National Handicraft, 199 William St., New York 7.

TURN your spare time into cash. Make quick-selling, highly profitable lamps—every home a prospect. No experience or special tools required. New 1950 56-page illustrated catalog shows shades, shade frames, figurines and bases, oil lamp converters, boring compounds, and dozens of similar items. Also all kinds of sockets, cords, pipes, harps, finials, bases, and hundreds of other parts—everything you need. Special 8-page section shows 6 beautiful lamps in kit form ready to assemble. You buy wholesale, sell at retail—make big profits. Hundreds doing it. You can, too. Send 25c today for catalog and wholesale price list. Refundable first order. Cearon Co., Dept. 500-A-1, 27 S. Desplaines, Chicago 6, Illinois.

LEATHERCRAFT Supplies, Leather & Tools, Low prices. Send 10c for catalog. Jonas Handicraft Co. (Dept. 1-P), 30 Frankfort St., New York 7.

89 FULL size Jig Saw patterns of beautiful shelves, ornaments, toys, novelties. Plus "How, Where to Sell." Only $1.00. Mastercraft 148, 7041 Olcott, Chicago 31, Illinois.

TURN Workshop Into Cash. Send dime for new 32-page catalog describing hundreds things to make for fun, profit. Craftplans, 1321-B South Michigan, Chicago 5.

8 BEAUTIFUL full-size whatnot patterns 35c. Joaness, P. O. Box 141-S, Omaha 7, Nebraska.

KNOCKDOWN Cedar Chest. Lumber and Veneers. Free Price List. Giles Co., Brownsboro, Alabama.

LEATHERCRAFT. Copper tooling. Textile painting. Make spare time, profitable time! Free illustrated catalog shows everything you need. Kit Kraft, 7377 Melrose, Hollywood 46, California.

NEW leathercraft catalogue Pleasure & Profit, new styles, Belts, Purses, Shoes, largest leathercraft school in U.S.A. G.I. approved. Send 10c for catalogue. Dept. PS-1, Apache Leather Co., 2804 E. Washington St., Phoenix, Arizona.

BRASS and Copper Materials. 24 page catalog 10 cents. Groundmaster Company, Div. B, Boulder, Colorado.

LEATHERCRAFTERS: Big illustrated catalog shows everything you need 10c. Arts Leather, 411 Joseph Ave., Rochester 5, New York.

70 LAWN-ornament and novelty patterns only $1. Six lawn-chair patterns $1. Write at once for new, free, price-list. Moebro Patterns, (R), 44 Victor, Mimico, Ontario.

CACTUS wood, lamp size sample, 60c postpaid. 214C East Yavapai, Tucson, Ariz.

80 FULL sized patterns, toys, novelties, lawn ornaments, $1.00. Modern Woodcraft, Saginaw, Michigan.

16 NEW lawn chairs, 22 picnic tables, benches, trellises etc. All 38 plans with necessary full size patterns, $1.00. Mastercraft 138, 7041 Olcott, Chicago 31, Illinois.

93 BUILD IT YOURSELF

BUILD reasonably priced alarm system. Indicates position of fire or burglar. Patent pending. Satisfaction guaranteed. Instructions $2.00. 613 E. 5th St., Chattanooga, Tennessee.

BUILD Your Own "Tractor." Plans, Walking, riding. Free information. Ellsworth Tractor Co., D-5, Camptonville, Calif.

MODERNIZE your kitchen. Illustrated manual shows every step. Save 70% the Thombert way. Wholesale on machined parts. Complete kit only $1.00. Thombert Company, Newton 21, Iowa.

BUILD inexpensive Concrete Blockmaker, also mixer. Motor-hand. Write Clyde Lee, Mountain View 1, Oklahoma.

$600 BUILDS Cozy 4 rooms and Bath. Concrete Block, stuccoed. Instructions & Blueprint $1.00. Farrow, G-82, Box 648, Columbus 16, Ohio.

BUILD with Concrete or Fieldstone. You Make Movable Form System. Free Literature. Smith PS, 2646 SE 122, Portland 66, Oregon.

FREE Literature describing needed Farm and Home Machinery, easily built by you from salvage materials. Kenneth Reeves, Box 3357-B, El Paso, Texas.

"CONCRETE Block Homes." 32 Page booklet on how to build, $1.00. Other Home Building booklets, $1.00. E. C. Lightfoot, Civil Engineer, Richboro, Penna.

GRANDFATHER clock building made easy. Shoptested photopackt plans dollar. Kuempel Clocks, Minneapolis 16.

94 WATCH REPAIRING

WATCHMAKERS', Jewelers', Hobbyists', tools-supplies. Catalogue! Bengal Company, Culver City, California.

WATCHMAKERS' Journal contains helpful hints on watch repairing. Sample copy 30c. Dean Co., 116-B Nassau St., New York 7, New York.

WATCHES Rebuilt. Made to Run Like New. Friesen Jewelers, Buhler, Kansas.

LEARN Watch-Clock Repairing at home. While learning we fix all watches for you. Inquire Modern Technical Supply Co., 55-PS West 42 Street, New York 18, N. Y.

95 OLD GOLD, WATCHES, ETC.

HIGHEST Cash Prices paid promptly for old and broken watches, jewelry, spectacles, dental gold, diamonds, etc. Mail articles today or write for Free shipping container. Lowe's, Dept. PS, Holland Bldg., St. Louis 1, Mo.

HIGHEST Cash Paid For old, Broken Jewelry, Gold Teeth, Watches, Silverware, Diamonds, Spectacles, Platinum. Free information. Satisfaction Guaranteed. Government Licensed. Rose Smelting Company, 29-Y East Madison, Chicago.

WATCHES Wanted. Any condition. Also broken jewelry, spectacles, dental gold, diamonds, etc. Cash sent promptly. Mail articles today or write for free shipping container. Lowe's, Dept. PS, Holland Bldg., St. Louis 1, Mo.

96 JEWELRY

JEWELRY Making. Illustrated catalog 30c. George Sassen, 35 Maiden Lane, N. Y. C. 7.

RHINESTONES, jewelry settings, cameos, sequins, beads. Catalog Free. J & M Novelties, Dept. CA-4, Griffith, Ind.

RHINESTONES - Pearls - Moonstones, wholesale. Patrician Import Company, 1818 Monroe, New York 57.

FINDINGS! Novelty Jewelry findings swept from manufacturers' tables. Parts for bracelets, pins, earrings, finished and unfinished chains, rings, stones, clips, beads, many others. Sample pound assortment $2.00, 5-pound lots $7.50. Also Unset stones, for rings, jewelry; all colors, sizes, designs. 1,000 assortment $5.00, sample 100 assortment $1.50. Also Beads, assorted colors, sizes, 5-pound lots $3.00, sample pound $1.00. Prepaid Only. Merchandise Distributing Company, 19 East 16th Street, Dept. 10, New York 3, N. Y.

97 TOBACCO & PIPES

FREE Valuable "pipemaking" instructions! Exciting new hobby. Carvapipe, 2829-A Dixie, Hamilton, Ohio.

100 MISCELLANEOUS

WE Buy, Sell, Trade, Any Thing Of Value. Agents Wanted. Box 155, St. Matthews Station, Louisville 7, Ky.

DRESSES 18c; Coats $1.00; Blouses 35c. Free Catalog. Crown, 164-PC Monroe St., N. Y. 2.

URANIUM prospecting information Free. Prospector, Box 142 C North Battleford, Saskatchewan, Canada.

YOUR Leather Jacket renovated expertly. Free circular. Berlew Mfg. Co., Dept. 7, Freeport, N. Y.

PANNING Gold lesson—Catalogue Beginners supplies. Mining Books, Maps, "Where To Go". Free. Old Prospector, Box 729D2, Lodi, Calif.

SUCCESS Simplified! Become a financial wizard; a mental giant; a muscular Superman; a romantic magnet; an expert in any field! Free literature. Success Society, Box 5852, Cleveland 1, Ohio.

OUTDOOR Toilets, Cesspools, Septic Tanks cleaned, deodorized with amazing new product. Just mix dry powder with water; pour into toilet. Safe, no poisons. Saves digging, pumping costs. Postcard brings free details. Burson Laboratories, Dept. D-13, Chicago 22, Illinois.

VALUABLE Big Mails, four months Listing, 25c. Wright' Publications, 2276-J Hubbard, Memphis 8, Tenn.

RUPTURED? $3.50 Truss Given For Trying "Easyhold" On 30 Days' Trial. 9313 Koch Bldg., 2906 Main, Kansas City 8, Missouri.

BIG Mails Three Month, 25c, year Name Listed Directory $1.00. Harvey Teeple, Decatur, Indiana.

MINERAL—Treasure Locators—Geiger Counters. Superior performance, lowest prices. Payment plan available. Free literature. Fisher Research Lab., Inc., Palo Alto, California.

INCREDIBLE! Unprecedented! Become a mental superman overnight! Floor everybody! No studying! 'memoprop' does all your thinking! It's uncanny! Revolutionary! Write: Bijou, Box 1727-V7, Hollywood 28, California.

CACTI—4 assorted plants $1.00. Marie Gilpin, Dept. PS-1, 7318 Beaty, Ft. Wayne 6, Indiana.

"INTERESTING Mails"—25c keeps your mail box full three months. Bents, Jr., Desk C/60, Chatawa, Mississippi.

COMPLETE flowermaking supplies. All colors highest quality wood fibre $3.75 dozen. Chenille dolls. Novelties. Etc. Crafts Catalog 10c. Clevemodel, 4507T4 Lorain, Cleveland 2, Ohio.

101 FOR SALE—MISCELLANEOUS

FREE catalog! War surplus clothing. Amazing bargains. N. Y. Clothing Co., N. Y. 29R.

PIANO Rolls—New, used, sold, exchanged. Susie Ketchum, Box 1058-M, Springfield, Illinois.

102 WANTED MISCELLANEOUS

MERCURY—Highest prices. Free Containers. Write Mercury Terminal, Norwood, Mass.

SCRAP Mercury (Quicksilver) Tantalum—Bismuth—Tungsten. Metallurgical Products Co. Established 1909. 35th & Moore Sts., Philadelphia 45, Pa.

103 FOR THE HOME

PLANT Shelf. Rests On Sill, Held By Window. Holds Two Plants, 65c. Whitefield, 257 Maple Ave., North Hills, Pa.

104 PERSONAL

DETECTIVE'S Opportunities. Particulars free. Write. Wagoner, P-125 West 86th, New York 24.

PSORIASIS Sufferers: Has everything failed to bring even temporary relief from scales, lesions and itching? Then write today for Free important information. You needn't invest one cent! Pixacol Company, Box 3583-S, Cleveland, Ohio.

GET ready to live! Will you gamble postal card inquiry to win happiness, successful income, love? Thousands have! Why accept fear, uncertainty, shyness, miserable lacks? "Now" develop magnetic "Faith-Power!" through "new, amazing", easy to use "Naturlaw-Formula." Win "your share of the "good" things of life!" "Plenty for All" who use 'Secrets' of 'Naturlaw'" is theme of 16-page "free" book. "Mountains of Gold". Tells how! Write today! Institute of Naturlaw, Dept. 76, Box 6137, Dallas, Texas.

"HOW Can I Find Out?" You Can! Information discreetly developed. Any matter, person, problem, anywhere. Worldwide. Officially licensed, bonded service. Established 1922. Reasonable. Confidential. William Herman, 170 Broadway, New York.

LOSING Your Hair? Have Dandruff? Itchy Scalp? Then send $1.00 bill for effective scalp treatment formula. S. Vigglano, Pharmacist, 6556 Ladson, Pittsburgh 6, Penna.

VAGABOND House Trailers Are Tops $2295.00 & $4595.00. Otho Dewitt, Centerline, Michigan.

INFORMATION for single people by Human Relations Consultant. Dr. B. Long. Box 375. Los Angeles 53. Calif.

MASTER Formula. Mental — Physical Abundance, Health, Prosperity, Success. Write: Theocrucians. Box 9609-1A. Hollywood 27. California.

MEXICAN Law. General Practice Attorney. 1203 Arizona Street. El Paso, Texas.

WASHINGTON postmark. Letters remailed 25c. Loyal. Box 7216. Washington, D. C.

BORROW by mail. Loans $50 to $300 to employed men and women. Easy, quick, Completely confidential. No endorsers. Repay in convenient monthly payments. Details free in plain envelope. Give occupation. State Finance Co., 210 State Finance Bldg., Dept. S-14. Des Moines 8, Iowa.

HAIRSAVER booklet. Avoid Baldness. Send 25c. coin, to Woods, 621 S. 12th St., New Hyde Park, N. Y.

ARTHRITIS!! Rheumatism! How to Attack & Eradicate Forever. Guaranteed. Don't Suffer. $1. Send Now. Hod Markley. (5) Allendale, N. J.

106 ADVERTISING

24 WORDS in 50 Weeklies. $4.96. H. J. Darnell. 730 Hays. Jackson. Tennessee.

ADVERTISE: 24 words, 40 Newspapers, $3.50. Lists Free. Advertising Bureau, 10511-P Springfield, Chicago 43.

BEFORE Advertising—get instructive Ad-Guide, ratebook 10c. Ideas developed. Advertisements prepared free. Chicago Advertising Agency (Established 1900). Chicago 4.

115 DRAWING & ART SUPPLIES

FREE Art Test. Give Age. Commercial. Box 8066. Dallas 5. Texas.

DRAFTING and artists' materials catalog—thousands of items—25c (deductible first $2 order). Gordon's, 219 Madison, Chicago.

117 TATTOOING SUPPLIES

TATTOOING Outfits, Supplies. Illustrated List Free. Zeiss. 728 Lesley. Rockford. Illinois

120 CANDY MAKING

MEN-Women—"Everybody likes Candy." Learn to make professionally at home. (Our 40th year.) Ragsdale Candies. East Orange. New Jersey.

128 HUNTING

FURS—raw—dressed—manufactured—from trapper to you; bear—lion—wolf—rugs—mounted heads—novelties; hunting trips arranged (established 1926) Munro—1363 Kingsway—Vancouver, B. C.

131 TREASURE FINDERS

TREASURE Hunters! New 11-pound featherweight Model 101 locator for gold, silver and minerals. Money-back guarantee best available. Also Geiger Counters for uranium prospectors. Complete information free. The Goldak Company, 1540 W. Glenoaks Blvd., Glendale 1, Calif.

EXPLORE abandoned mines, hills, deserts, streams for natural Gold, Silver, other precious metals. Seek Fabulous riches in buried treasures! Details Free. Pathfinder Company, Dept. 1PS, 1726 Beverly Drive, Pasadena 7, California.

SEEK Gold, Uranium, Buried Treasure! Latest low cost super-sensitive equipment. Free literature. Glen Scientific, Box 151-D, Glen Ellyn, Illinois.

TREASURE—M-Scope Geiger Counters—Mineral Locators. Why buy something inferior when you can buy the best at a lower price? Backed by years of experience. Fully guaranteed by factory. Detects minerals, metals, gold, silver, coins. Payment plan available. Proven superior performance. Free 16 page illustrated booklet. Fisher Research Lab., Inc., Palo Alto, Calif.

GEIGER Counters. $29.95 complete, less phones. Steel case, 4⅜ x 2⅝ x 1-9/16. Fits pocket or purse, weighs 1 lb. New, also Aircraft Generators, Starters and Hydraulics. Roberts Surplus Company Bldg., 725 Oakland Airport, Oakland 14, California.

137 DETECTIVES

DETECTIVES—Work home—Travel. Experience unnecessary. Detective Particulars free. Write, Wagoner, P-125 West 86th. New York 24.

DETECTIVE Training. Phillips Secret Service System, 1917-C North Kenneth, Chicago 39, Illinois.

SECRET Service, fingerprint training at home, in spare time. Write, Associated Special Investigators, Box 474, Saint John, N.B., Canada.

BE a private investigator, for pleasure, profit. Details Free. Arrow Publishers, 5548-D Farragut Avenue, Chicago 30, Ill.

141 HEARING AIDS & REPAIRS

LOW Cost Hearing Device. No batteries. No Wires. Simple ear plug that carries sound to the ear drum. Beaudry, Dept. "Z", 4327-30th Avenue South, Minneapolis 6, Minnesota.

142 INFORMATION

AMATEURS—Reasonable Charges For Help On Radio Problems and Research Engineering. Hy. Twillmann, RR.#1, Chesterfield, Missouri.

143 NAME LISTS

MAILING Lists. All Kinds 1000 $5.00. Dixie Service, King, N. Carolina.

SPECIAL—1000 Opportunity Seekers names, $1.00. Wilbur Errickson, Englishtown, New Jersey.

MODERN LAWN MOWER SHARPENER

FOR LAWN MOWER SHOPS
FIX-IT SHOPS
GOLF COURSES • PARKS
101 OTHER JOBS

Sharpens All Reel Type Mowers • Hand, Power or Gang • 10 to 20 Minutes • No Dismantling • No Extra Attachments Needed.

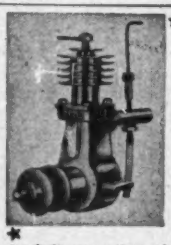
All reel type mowers, from 5-inch hedgers to 36-inch power mowers, are quickly sharpened to extreme ends of both left and right twist blades. Handle, wheels, roller and motor remain in place when sharpening is in process. Bed knife is sharpened in same brackets. Grinding head rides on five ball bearing races. Easy to operate. Also sharpens chisels, joiner knives, planer blades. Big profit maker. Own your own business. Send Today for FREE Illustrated Bulletin No. 11-C1. Prices Subject to Change Without Notice.

PRICE $241.50 less motor

$263.00 with motor

ORDER NOW
Immediate Delivery

MODERN MFG. CO. 2011 N. FAIR OAKS AVE. PASADENA 7, CALIFORNIA



Our 350th Advertisment

REAL DIESEL ENGINE!

$2.95 You can't beat this price!

- Ideal for planes, boats, midget cars
- Actually runs at 7500 RPM, produces 1/7 HP
- Height a full 3½ inches: weight 8 ounces.
- Comes to you completely assembled, ready for operation.

MAYBE WE'RE CRAZY, giving away a precision diesel engine, complete with cylinder and piston, carburetor, crankshaft, connecting rod, etc. for ONLY $2.95. But we're selling thousands of DEEZILS all over the world, and that keeps our production costs down. DEEZIL is streamlined, compact, rugged. Starts quickly, easy to install, runs for years! Fast delivery if you ORDER DEEZIL TODAY!

Send $2.95 plus 25c postage

GOTHAM HOBBY CORP., Dept. S, 107 E. 125th St., New York 35, N. Y.

GADGETS, TRICKS, JOKERS, HOBBIES, FUN-MAKERS, ETC.

Catalog of Nearly 8,000 Novelties---Nearly 600 Pages

Collier's, Coronet, New Yorker, Tide Magazine Write About This Amazing "World's Most Unusual" Catalog

More interesting than normal, comic, world's fair & sponge exhibit rolled into one. Odd hard-to-get novelties, gadgets, furnishers from all over world. More fun than reading best selling book. Costs us nearly $1.00 a copy. You send only 10c for this big 600 page catalog—nothing more to pay or buy. Partial contents:

Novelties, Jokers, Hobbies, Fun-Makers, Etc.

Thermometers, Throwing Knives, Tie Novelties, Time Savers, Tools, Toys, Trapping, Trick Flashers, Tricks, Trophies, Turtles, Typewriters, Vaults & Banks, Vendors, Ventriloquism, Wallets, Watches, Water Novelties, Weird Articles, Western Goods, Whips, Whistles, Wigs, Wrestling Items & Many Others

SEND 10c TODAY WITH YOUR NAME AND COMPLETE ADDRESS—NO LETTER NECESSARY

10c

Big 600 page catalog of over 7000 novelties, 8500 pictures, 6-color cover, 1-inch thick. Send 10c at once—no obligation. (Postage stamps accepted).
Rush 10c with name & address today to: JOHNSON SMITH & COMPANY, DEPT. 230, DETROIT 7, MICHIGAN

Earn Big Money WRITING ORDERS

AMAZING NYLONS

Guaranteed Against

RUNS AND SNAGS

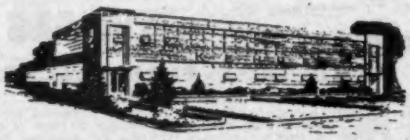
Regardless of Cause!

The world's ONLY complete, nationally advertised nylon hosiery line actually guaranteed against runs, snags or excessive wear, REGARDLESS OF CAUSE! It's amazing, but true! No matter what the cause—hard use or deliberate abuse—Kendex nylons are replaced FREE if they run, snag or become unfit for wear within entire guarantee period! Every weight from sheerest 15 denier to heavy 70 denier—all gauges up to luxury 60 gauge—all sizes, lengths, popular shades, fancy heels, black seams—full fashioned and seamless. Nothing is missing to make sure every woman is pleased. In spite of the amazing guarantee, retail postage prepaid prices are no higher than comparable quality national brands. Should free replacement be necessary, actual cost is cut in half! How could any woman possibly resist saving money and solving her hosiery problems? NOT SOLD IN STORES. Men and women wanted NOW, spare or full time, to write orders and earn big money. You can get orders even if you never sold a thing in your life!

Guaranteed by Good Housekeeping

FREE SAMPLE STOCKING

Man or woman—young or old, YOU can easily earn steady income, spare or full time. No money or experience needed. We supply EVERYTHING free and set you up in business at OUR expense. Nothing to buy or deliver. Write orders. We deliver and collect. Big advance pay plus huge cash bonus that increases your earnings up to 40%! Your name and address on postcard will bring you sample stocking; self-selling sales books with FULL COLOR illustrations; 32-page sales manual showing you easy steps to success; color cards, free "door openers" worth $1 each but which you give away free; special plan to have others sell for you, etc., etc. You can start making money the minute you receive the complete FREE outfits!



YOUR COST ONE CENT!

SEND NO MONEY. Pay nothing now or later. No obligation. Not even a promise to return outfits. Simply write your name and address on a penny postcard and mail to us. We'll immediately rush you everything you need FREE and postage prepaid. WRITE TODAY!

KENDEX CORPORATION • BABYLON 849 N. Y.

THERE'S GOLD in GOOD IDEAS!

• Rochester, New York, with its nationally known industries and progressive business community, is constantly seeking new ideas which can be converted into profitable products or enterprises. If you have something worth talking about,—something for which there is a market at a minimum price,—then write for details to Division of Public Relations, Rochester Department of Commerce, 54 Court St., Rochester 4, N. Y.

IN ROCHESTER, GOVERNMENT *HELPS* BUSINESS

Pioneers — Leaders

AIR RIFLES — **BENJAMIN** — AIR PISTOLS

SHOOT WITH SAFETY

BE SAFE—SHOOT WITH COMPRESSED AIR—ALWAYS READY
No Cartridges or Tanks to Replace or Recharge. If you want the most PRACTICAL GUN to use anywhere—inside or outdoors—get a SAFE—CLEAN—ECONOMICAL BENJAMIN with Adjustable Power and Amazing Accuracy. Send for Free Folder of Latest Models Today.
BENJAMIN AIR RIFLE CO., 983 MARION ST., ST. LOUIS 4, MO.

DON'T MISS READING LAWN CARE

These timely bulletins tell how to solve your lawn problems. Like one New Jersey reader says, "LAWN CARE is jam-packed with good advice." Send now for the current issue and learn how to start your lawn off right this Spring. Just drop a card to O M Scott & SONS CO, 28 Spring Street, Marysville, Ohio • also Palo Alto, California

FREE 2 year subscription

WORLD'S FINEST MODEL AIRCRAFT

THEY'RE FLIGHT-ENGINEERED BY EXPERTS!

MIN. ORDER $1 • ADD 25c PACK-POST • CATALOG 10c

CLEVELAND MODEL 4507A24 Lorain Ave. Cleveland, Ohio

LOW COST!

ON SNOW, ICE & WATER

• MAKE BIG MONEY WINTER & SUMMER

Power unit complete with plans at low cost. Write for free booklet and details.

GAARE SUPPLY CO.
BOX 277, DEPT. Z, WEATHERFORD, TEXAS

LAWN ORNAMENT-NOVELTY PATTERNS

28 Lawn Ornament Patterns, 25c. Other patterns: 15-20" high; Dutch Girl, Dutch Boy, Pirate, Bull Terrier, Mexican Girl, Mexican Boy, Dwarf, Penguin, Flower Girl, 10c each. 25 Novelty Patterns, 30c. All 62 Full Size Patterns, $1.00 Postpaid.

• FLYING DUCK

Wind revolves wings. Realistic appearance. Pattern, Instructions and wing Pinion Kit: brass bearing, steel shaft, wing lugs, bolts, nuts and washers, 50c. Pattern and Instructions without kit, 25c. Postpaid.

STROTHER PATTERN SERVICE
Dept. 7-BV Box 128 Bellington, W. Va.

WHEELS—WHEELS

5" Disc Wheel 5/8" Tire 5/16" or 3/8" sleeve	30c ea.
6" Disc Wheel 5/8" Tire 5/16" or 3/8" sleeve	35c ea.
7" Disc Wheel 3/4" Tire 3/8" sleeve	45c ea.
8" Disc Wheel 1 1/4" Tire 1/2" sleeve	70c ea.
7" Disc Wheel 1" Tire 1/2" ball bearing	80c ea.
8" Disc Wheel 1 1/4" Tire 1/2" ball bearing	$1.00 ea.
8" Disc Wheel 2" semi-pneum. T. 1/2" B.B.	$1.35 ea.
10" Disc Wheel 1.75 semi-pneum. T. 1/2" B.B.	$1.50 ea.
12" Disc Wheel 1.75 semi-pneum. T. 1/2" B.B.	$1.95 ea.

Above wheel prices include hub caps.
Plus Postage. 20¢ -- C.O.D.'s accepted.

UNITED WHEEL STAMPING CO., PS-1
2756 W. 115th STREET CHICAGO 43, ILLINOIS

Build your own *JET ENGINE!*

Order these plans today

1. JET PROPELLED BICYCLE. Assemble your own. Photo and instructions $1.00.
2. HOW TO MAKE EXPERIMENTAL JET ENGINES. Seven sheets drawings with information and instructions $2.95.
3. BOTH OF ABOVE in one order $3.75. SEND NO MONEY. Order both at once $3.75 C.O.D. in USA plus c.o.d. postage. Send check or Money Order and we pay postage. Get other information too. Rush Order.

J. HOUSTON MAUPIN, Dept. 66, Tipp City, Ohio

A REAL SURE-FIRE SELLER!

THUGS AND THIEVES BEWARE!

Here is a tear gas pencil gun which discharges smothering clouds of tear gas to instantly stop, stun and incapacitate the most vicious man or beast. A safe and effective substitute for dangerous firearms. No permanent injury. Needed in Stores, Banks, Autos and Homes, everywhere to protect Life and Property. No skill required. Handle our tear gas as a side line and you'll soon give it full time. For a quick start send $3.60 for complete demonstrator outfit consisting of an Automatic Pencil Gun with 16 demonstrators and 3 powerful Tear Gas cartridges fully guaranteed. Many thousands now in use. Order your outfit today. Not sold to minors.

Hagen Supply Corp. Dept. D-501 St. Paul 4, Minn.

Up to $18.00 in an Evening's Spare Time!

29,000,000 prospects waiting for amazing refrigerator control! EXCLUSIVE D-Frost-O-Matic ends messy, wet defrosting . . . Saves Food . . . Saves Electricity. Safe, Automatic—GUARANTEED TWO FULL YEARS!

SURE-FIRE SALES PLAN—Clicks 95 times in 100 in Homes, Apartments. Harry Smith of Florida made $1,500 in 1st two weeks. How much do you want? Write for FREE DETAILS—TODAY! Specify Territory.

D-FROST-O MATIC

6 N. Michigan Ave., Dept. PS-1, Chicago 2, Ill.

Make Money SELLING Eshelman Tractors Plowing Snow From Roads and Driveways

RAKES, PLOWS, CULTIVATES, HARROWS, HAULS, SPRAYS, SAWS, DOZER, MOWS, CUTS, ROLLS, SNOW PLOW

ESHELMAN

$95 FOR 1 TOOLS

FOR BETTER LAWNS and GARDENS also POWER MOWERS and RIDING TRACTORS Women can operate it

Free Catalog. Write ESHELMAN CO. Dept. 117 110 Light St., Balto. 2, Md.

HAUCK FLAME GUN **KILLS WEEDS**

KILL WEEDS, crab grass, Canada thistle—stalks, seeds and roots. Destroy brush, caterpillar nests, diseased trees, grasshoppers, chinch bugs, etc. Clear irrigation ditches, split rocks, burn tree stumps . . . Sterilize poultry houses, kennels, barns. Use as portable home forge. Melt ice, thaw pipes. Safe, inexpensive. Burns only 6% kerosene, 94% air! Thousands satisfied users. 7 models. Write for FREE CATALOG.

HAUCK MFG. CO., 88 Tenth St., Brooklyn 15, N. Y.

WORLD'S SMALLEST RADIO $4.99!

made today. **Cigarette Pack Size—A Real Radio—Not a Toy! No tubes, batteries or electric "plug-ins" needed!** Red plastic cabinet. **Guaranteed to work** on local stations if used as directed or money back! **Use most anywhere you go!** *Should last for years!* **SEND ONLY $1.00** (bill, ck., mo.) and pay postman $3.99 C.O.D. plus postage or send $4.99 for p.p. delivery. **Complete** with personal phone and **Extra Long Distance Aerial Kit.** Wonderful Gifts. **Limited Supply on Hand—Order Now!**

MIDWAY CO., Dept. BPS-1, KEARNEY, NEBR.

LEATHER AVIATOR'S HELMET

No hooks, tubes or holes. Brand new, genuine Navy. Cordovan brown leather, **fleece lined.** Detachable chin strap. Perfect for flyers, cyclists, etc. Children love them! Sizes small, medium, large. Cost gov't. $10.00 . . . you buy for only **$1.75** ppd.

NAVY SOUND POWER PHONES

Brand new . . . mfg. by RCA. Over ½ mile range, simple hook-up. No electricity required—splice 2 wires and talk. Complete with headset, transmitter, chest plate, mike, PLUS 24 ft. cable—no extras needed. Linemen, miners, engineers, all construction workers will find these phones a time, labor, and money saver. Fair Ppd. **$13.95**

Send cash, chk. or m.o. COD's plus postage accepted. Money-back guarantee.

GRAND-HAWTHORNE SURPLUS

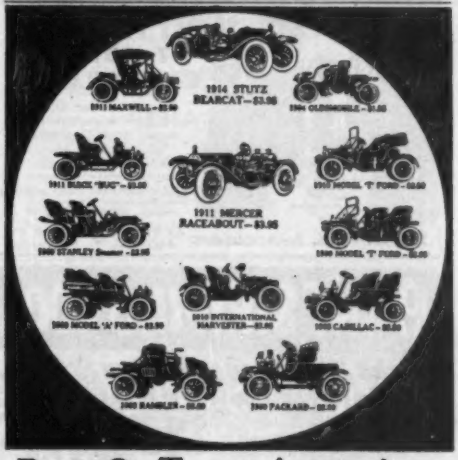
1439 S. E. Grand Dept. PS-1 Portland, Oregon

FOR EASY HOME ASSEMBLY

20 MODELS U-MAK-IT BOAT KITS

SEND 25c (coin) TODAY **NEW CATALOG** SHOWING ALL 1951 MODELS, MOTORS AND ACCESSORIES

U-MAK-IT PRODUCTS 703R-WHITTIER ST. New York 59, N. Y.



Build "Old Timers" Antique Autos

RELIVE the Early Days of the Pioneer Autos!

WHAT A THRILL to build your collection of these famous antique cars — each one easy to assemble with pre-fabricated parts! Above we sketch the 13 cars of bygone days — so colorful, historical and authentic — actual ¾" scale models! They range in length when complete from 6½" to 10½".

SEE them at your hobby, toy, or department store, or write to us Add 25c for postage and handling; no C. O. D.'s, please.

Hudson Miniatures' "OLD TIMERS"
SCRANTON HOBBY CENTER Dept. 28 Scranton 10 Pa.

YOUR WORK DESERVES . . .

FIND YOUR NEAREST DEKTUFT RETAILER BELOW

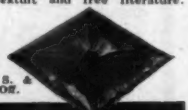
The Cain-Sloan Co., Nashville 3, Tenn.; The Fair (Schermerhorn Co.), Fort Worth, Texas; Fair Department Store, Anderson, Ind.; Gimbel Brothers, Philadelphia, Pa.; Goldblatt Bros., Inc., Chicago, Ill.; Hale's, Oakland, Calif.; The Hecht Co., Washington, D. C.; The Higbee Co., Cleveland, Ohio; The J. L. Hudson Co., Detroit 26, Mich.; F. & R. Lazarus & Co., Columbus, Ohio; Leonards, Fort Worth 2, Texas; R. H. Macy & Co., New York City; The May Co., Cleveland 14, Ohio; Milwaukee Boston Store, Milwaukee 3, Wisc.; Mandel Brothers, Chicago, Ill.; Rich's, Inc., Atlanta 2, Ga.; The Rike-Kumler Co., Dayton, Ohio; Sears, Roebuck & Co., Drapery Dept.; The John Shillito Co., Cincinnati 2, Ohio; Stix, Baer & Fuller, St. Louis, Mo.; John Wanamaker, Philadelphia, Pa.; Montgomery Ward, Jamaica, N. Y.

DEKTUFTS!

Yes, your craft work deserves these luxurious 4-inch square, leather-like tufts. They add a colorful, professional finish to headboards, home bars, toy chests, tables, wall surfaces, and hundreds of other home decorating projects. So easy to use a child can mount them. Dektufts* attach to any wooden surface . . . last for years. Available in 9 handsome colors at retailer nearest you.

FREE LITERATURE AND SAMPLE

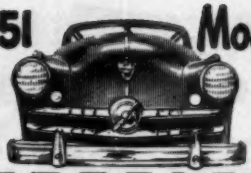
If there is no retailer in your vicinity, send 25c to Deks, Inc., Dept. P-4, for sample Dektuft and free literature.



*Pat., U. S. & For. Pat. Off.

DEKS, inc. 482 Broome St., New York 13, N. Y.

1951 Models



CROSLEY

You have to drive a 51 Crosley to know the car as it is today. Bigger, sturdier, heavier. Powerful engine with 7.8:1 compression ratio, hundreds of mechanical improvements. New interior and exterior features and styling. Crosley gives you 35 to 50 miles per gallon. And Crosley is still the only new car you can buy for less than $1,000. Lowest price, lowest down payment, lowest monthly terms. So see your dealer—test drive the new 1951 Crosley—the most improved car!

FREE! 1951 Crosley Catalog! Write Crosley Motors, Inc., 2530-GY Spring Grove Ave., Cincinnati 14, Ohio.

CROSLEY a FINE car "You see them everywhere"

FOR FAST ECONOMICAL WINTER TRAVEL BUY A

SnowCar

Four passenger 125 h.p. model as low as $1985.00. Two passenger models—$1550.00.

CALLAIR
AFTON, WYOMING

FREE Bargain Book

Packed with hundreds of sensational bargains—new and used—in still and movie photo equipment and accessories. Write for your free copy today to

Central Camera Co.
Dept. 10-A, 230 N. Wabash, Chicago 4, Ill.

Photographic Headquarters Since 1899

BRAND NEW

30 DAY FREE TRIAL
7x50 Prism BINOCULARS

Finest Precision Optics
Lightweight Aluminum Bodies
Money Back Guarantee

Many other models
AS LOW AS $6.00
(*plus 20% fed. tax)

FREE Illustrated Catalog & Book, "How To Select Binoculars"
Dealer inquiries invited

BUSHNELL Binoculars 43 E. Green St. Dept. P-1 Pasadena 1, California

SPORTONE MUFFLERS

Ford & Chevrolet	$ 4.45
All other popular cars	5.45
V-8 Dual Sets	15.95
Chromed Silentips	2.95

(Please state make & year of car on all orders.)

SANDEE MUFFLER CO.
5643 Corryne Place • Culver City, California

PAINT STRIPING TOOL

Works Like a Fountain Pen

Stripes with PAINT instead of INK!

This amazing new PAINT STRIPING TOOL makes it easy to do expert striping on furniture, bikes, model planes, autos, signs, linoleum, toys, wall board, etc. Makes plain, painted walls look like tile. Paint straight lines, curved, circular or evenly spaced parallel lines the same way a professional painter does. Simply fill Tubular Glass Paint Fountain with any color paint & wheel tip feeds paint evenly. Tips interchangeable – jaws split apart for easy cleaning. Tool complete with tip for 1-16 in. stripe only $1 postpaid. Other complete tools with 1-64, 1-32, 3-64, 1-16, 5-64, 3-32, 1-8 in. tips, $1.50. Separate tips, 75c. **Complete Kit** with tool and 7 tips, $5.00. Handiest tool in painter's kit. Get it now. C.O.D. postage collect.

WENDELL MFG. CO.
4234 N. Lincoln Avenue
Dept. 21, Chicago 18, Illinois

$1.00 POSTPAID

DEALERS
Paint Striping Tool
Packed in attractive Display Cartons of one dozen. Fast, profitable seller. Write for illustrated circular, discounts.

Paints Curved, Circular or Straight Lines

NO MORE RAT TROUBLE!

Easy to use

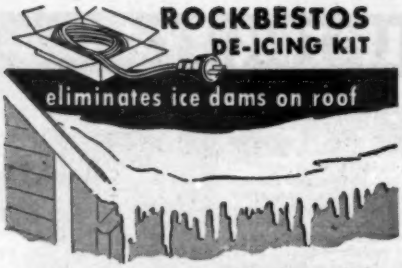
Catches more

Protect your grain and poultry with a guaranteed HAVAHART trap. Captures without injuring; can't hurt children or pets. No springs or jaws. Humane. Rustproof. Sizes for all needs. Send coupon today for price list and free booklet on trapping and bait.

HAVAHART 37-J Water St. Ossining, N. Y.
Please send me free booklet and price list.

Name .....

Address .....



ROCKBESTOS DE-ICING KIT

eliminates ice dams on roof

...saves costly repair of walls and ceilings

This complete heating kit—ready to use—protects 18' of roof by melting ice on roof edge and gutter. Eliminates winter water damage... costly replastering and repapering. Easy to install... will not damage roof. Kit contains 60' durable, lead-covered heating cable with plug, roof clamps, instructions. 120 Volt AC-DC.

See your ELECTRICAL DEALER or WRITE to

ROCKBESTOS PRODUCTS CORP.
New Haven, Connecticut

THRILLS! TRAVEL! ADVENTURE!

RIDE THE NEW 1951

HARLEY-DAVIDSON *Hydra-Glide*

Share in this glorious fun! Make new friends. See faraway places. Be free to go when and where you wish... with the exciting new 1951 Harley-Davidson Hydra-Glide, world champion! Amazingly smooth, powerful, beautiful. See your dealer. Write for FREE ENTHUSIAST magazine and literature.

HARLEY-DAVIDSON MOTOR CO.
Dept. PS, Milwaukee 1, Wisconsin

$ FREE COURSE! BIG PROFITS! $

Only $19.75 complete

Flocks & Sandblasts

Dual Purpose Spray Gun! Uses only 25 lbs. Air Pressure!

● Thousands of uses in Home, Shop, Industry: Makes Auto Interiors Clean & New, Lines drawers, Marproofs lamp bases, Refinishes any object. All in colorful Flock. Etch & Frost windows, glassware, etc. Removes Paint & Rust from Autos, Tools. Guaranteed! Send $19.75 or write for free information. **Complete Flocking Supplies!**

BLASTO SPRAY GUN MFG.
Dept. PS-1, 7007 Haas Ave., Los Angeles 47, Calif.

For Hard-to-Heat Rooms

Only $8.95 each Postpaid

INSTALL this 7" **NESTER** Booster Fan in a few minutes with cutting tool furnished by us at price below. Fan throws extra heat to cold room as desired. Furnished assembled to curved mounting brim 6" x 10" for simple fastening with 2 metal screws. Quiet motor is 110 V. 60 cycle, has 4 ft. cord & plug. Fan delivers 300 cu. ft. min. Complete instructions and cutting tool furnished. See your dealer or send check or money-order today $8.95 ea. postpaid U.S.A. or COD plus charges.

Money-Back Guarantee.

NESTER METAL PDCTS., ALBION, MICH.

"It Measures As It Rolls"

ROLLER RULE

HANDY MECHANICAL PENCIL

Measures Curves and Straight Lines. Any Shape. Any Distance. Any Surface.

$1.00 POST PAID

Roll head over surface. Inches and fractions record accurately on "Inch-O-Meter". Excellent pencil too! Order Now! 10 Day Money Back Guarantee! C.O.D. (postage extra). In Calif. add 3% Sales Tax.

PENCIL SALES CO., Dept. PS-1
Room 6, 1213 E. Ocean Blvd., Long Beach, California

SHAKESPEARE'S BIG NEWS FOR '51!

Model 1924 chrome plated for fresh or salt water $12.00 List Price

NEW DIRECT DRIVE REELS with LQT* NYLON GEARS

A three year test under severest conditions proved these revolutionary new reels the finest ever for ruggedness and casting ease. *Lighter—nylon gears weigh a third as much as metal; *Quieter—nylon absorbs sound, metal conducts sound; *Tougher—nylon gears outwear metal by far in laboratory tests. Two gear DIRECT DRIVE construction gives you the greatest sturdiness ever built into reels.

Model 1926 lightweight aluminum, List Price, $12.00
Model 1973-D with Carboloy bushings, List Price, $16.50

SHAKESPEARE

HOWALD-PROCESS FIBER GLASS WONDERODS

... Now as Low as $9.75

SHAKESPEARE COMPANY
Dept. PS-1, Kalamazoo 2, Michigan
Send me your free 1951 Tackle Book and Fishing Calendar.

Name .....
Address .....
City.....*Zone*.....*State*.....

EASY TO BUILD Roberts Kit-Craft BOATS

8 NEW MODELS! FROM $42.50

Prams - Cartops - Skiffs - Runabouts - Sailing Prams - Speed Hulls - Runabouts ... 8 to 14 ft.

Every model thoroughly guaranteed... Finest marine materials.

Easiest home construction known! No "throwaway" jig required. All brass screw fastenings.

Available at your favorite marine store - or order direct.

Send 10c for Illustrated Booklet

Roberts INDUSTRIES, Inc.
357 MAIN STREET DURHAM CONNECTICUT U.S.A.

Only 3/4¢ per mile total operating cost

▶Easy To Buy!

▶Easy To Ride!

▶Easy To Park!

Write for it. New! Rider-Agent Plan

In the language of low-cost transportation CUSHMAN is THE word. It says everything—Low purchase price—low upkeep—very low operating cost—¾ cents per mile! You'll be money ahead and miles ahead to GO CUSHMAN this year. Get the facts now. Write DEPT. 1S at once for FREE illustrated literature.

FREE! Folder Just Out.

DEALER INQUIRIES INVITED

Cushman MOTOR WORKS, INC. LINCOLN NEBRASKA

USE YOUR ATTIC

Install the PRECISION folding stairway YOURSELF

Fits all ceilings. Just saw the hole in your ceiling—frame the hole with 2x6's, nail the stairway in place and cut off the stairway at the calibrated ceiling height. The Precision Stairway is simple and easy to operate. No springs, actuated by counterweights, it's perfectly balanced, raising or lowering easily with one hand. Composition safety treads on steps. Insulated door panel. Requires no attic space. Made of No. 1 kiln dried popular with cast brass hinges, heavy cast aluminum rocker arms and brackets. Approved by F.H.A. everywhere

See your local lumber dealer or write direct today.

Manufactured by

PRECISION PARTS CORP.
Nashville 7, Tennessee

ELECTRICITY *Anywhere*

FOR PORTABLE, EMERGENCY OR HOME USE

ONAN Electric Plants furnish modern city-type electric service for homes, farms, cabins and resorts beyond the high-line. Lightweight, portable A.C. and D.C. plants serve contractors, estates, fire departments, etc. Automatic standby plants protect hospitals, radio stations, hatcheries. Over a hundred models—400 to 55,000 watts. *Gasoline or Diesel powered*

WRITE FOR CATALOG

D. W. ONAN & SONS INC.
6723 ROYALSTON AVE. MINNEAPOLIS 5, MINN.

AMAZING NEW CHEMICAL MAKES

OLD BUMPERS LIKE NEW!

$1.00

NOT A PAINT! NOT A POLISH! Looks like expensive chrome plating! Wonderful new chemical puts chrome-like finish on car bumpers, door handles, trim, etc. No electricity—no plating tanks—no acids needed. Just smooth it on and watch it gleam. Takes a brilliant polish JUST LIKE CHROME—so simple a child can do it. REFINISH BUMPER IN 10 MINUTES! WORKS LIKE MAGIC—finish lasts for years. Increases resale value of your car and adds NEW beauty to other chrome plated or metal items. TRY AT OUR RISK! **SEND NO MONEY!** Just send name and address. Pay Postman amazing low price of $1.00 plus few cents postage for each kit ordered, or send cash and we pay postage. Try kit 10 days. If not delighted return for instant refund! **Bumper Re-New, Rm. 23, Box 147, Mountrancck, Mich.**

REAL ESTATE BE A BROKER

PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! No obligation. Graduates report making substantial incomes. Start and run **your own business quickly.** Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. **STUDY AT HOME** or in our classrooms in big cities. Diploma awarded. G.I. approved. Nationally known.

FREE BOOK TELLS HOW

WEAVER SCHOOL OF REAL ESTATE (Est. 1936)
15 E. Pershing Road, Dept. PSB, Kansas City, Mo.

Only $498

OTTAWA
Mule Team Tractor

Finest low-cost tractor. Costs too little to do without. Engines burn gasoline. **Seven models.** Starter and lights available. Other larger Models to choose from. Over 4,000 in world-wide use. Time-proved and tested. At low cost they easily mow, plow, disc, harrow, plant, cultivate, etc. Sold only direct to user. Write for FREE details.

Ottawa Mfg. Co., 2-101 Garden St., Ottawa, Kansas

GROW WITHOUT SOIL!

YOU can grow vegetables, flowers or rare plants without soil (HYDROPONICS) every day of the year. Start this fast, clean EASY way to grow any plant for fun or PROFIT now. Big returns from small space. Send postcard today for FREE picture book showing how others from every state are succeeding in this new wide open field.

C. GILBERT & CO., 3535d Enterprise, San Diego 10, Calif.

NEW! *Electric Motors*

New General Electric ½ H.P. Induction Type 3450 RPM 110 V. 60 cy. 1 ph. A.C. Motor . . . #GEH-5 **$21.75**
New General Electric ½ H.P. Cap/Ind. Ball Brg. 1750 RPM. double ½" shaft. 110 V. 60 cy. 1 Ph. A.C. Motor . . . #GE-17 **$26.50**
New General Electric ¾ H.P. Cap/Ind. Ball Brg. 1750 RPM double ½" shaft. 110-V. 60 Cy. 1 Ph. A.C. Motor . . . #GE-75 **$34.50**
New Eicor 1 H.P. Capacitor Induction 1750 RPM. 110/220 V. 60 Cy. 1 Ph. A.C. Motor . . . #EG-17 **$45.00**
New Emerson 1 H.P. Heavy Duty, Repulsion Induction. 3450 RPM. 110/220 V. 60 Cy. 1 Ph. A.C. Motor . . . #EH-1 **$42.50**
Same as above, 1½ H.P. 220-V only, #EH-15 **$57.50**
Same as above, 2 H.P. 220-V only, #EH-20 **$67.50**

These prices are F.O.B. Chicago. Order by number. We have large stock of special & standard motors. ALL SIZES. Write for prices on the motor you need.

C. MARSHALL SALES, 3546 W. Fullerton Av., Dept. PS-1, Chicago 47

PRESTO! ANYONE CAN MASTER GLAZE

Car Owners! Meet Master Glaze—the sensationally different luster for new and used cars! Not a wax—not an oil polish—not a paint!—nothing that "smears" over the surface.

MASTER GLAZE is a unique discovery—a creamy liquid—quick and easy to apply! Gives a hard, glass-like surface. Even gasoline cannot dull it! Lasts six months to a year! Amazing luster—beautiful, sparkling clean and brilliant! Doesn't finger-mark—doesn't smear! A match box full glazes an entire car. Seals the pores—protects! NOTHING LIKE IT!

AGENTS
An unusual opportunity! Quick, flashy demonstrator. Big profits. Good territory. Write today!

FREE SAMPLE
Just send your name and address to
MASTER GLAZE CO., 7720-705 W. Harwood Ave., Milwaukee, Wis.

NEW! CHEAP! OIL BURNER
SWEEPING THE COUNTRY!

SALESMEN BIG MONEY

SLIPS INTO ANY COAL RANGE, STOVE OR FURNACE Amazing quick, intense heat. By finger-tip control. Cheaper than coal. No more shoveling coal or ashes. SENT ON TRIAL. Prove it pays for itself quickly by what it saves. $1 bonus for testing. We'll let you try one in your own home for one month. Write for details today. NORTHWEST MFG. CO. Dept. 138, Mitchell, S. Dak.

Build and drive the fastest boats in the world. 3 point Hydroplanes, Runabouts, Inboard and Outboard With our easy to use plans you save ¾ of cost usually required. Be first. Send 25c to **Champion Boats** for illustrated catalog. P. O. Box 7006-H-1, Long Beach, California.

THE SUREST DRIVER ON THE ROAD HAS A
HULL AUTOMOBILE COMPASS

Supreme confidence, pleasure in driving result from always knowing which way to turn. Patented features, such as easier, more positive adjustment against magnetic interferences in your car, make the Hull your best buy for better motoring. At your Dealer's. Write for literature.

Beauvoir Illuminated $5.95
Standard $3.95

HULL MFG. CO. P. O. Box 246-E1 WARREN, OHIO

TUBELESS *Personal* RADIO

POCKET SIZE! GUARANTEED to play on local stations

- No Tubes
- No Batteries
- No Electricity

Costs nothing to run, lasts indefinitely. Range up to 25 miles (some users report up to 50 miles on 50,000 Watt stations). New Germanium Diode rectifier—same as used in Army-Navy Radar sets. Extra sensitive stethophone. Designed, mfgrd. by a widely known electronic engineer. Beautiful red plastic case, with bright green trim. Single-control tuning, has rich, mellow tone. Just hook it up on simple instructions—it plays instantly, never turns off. Nothing to wear out; should last for years. Sent postpaid—cash, check or money order. No C.O.D.'s. Complete—nothing else to buy—$5.00.

Pat. Applied

Patrick Laboratories, Inc. Dept. PS-1, 2450 E. 52nd St., Indianapolis Indiana

FIREPLACE WARMS ALL THE ROOM, EVEN ADJOINING ROOMS

Heatilator draws in air at floor level . . . heats it and circulates warm air to all corners of room and even adjoining rooms.

CIRCULATES HEAT!

Build your fireplace around the Heatilator* Fireplace unit and enjoy the cheer of the open fire *plus* cozy warmth in every corner of the room.

WILL NOT SMOKE . . . The Heatilator unit is a scientifically designed steel form, complete from floor to flue, around which any style fireplace can easily be built . . . assures correct construction, eliminates common causes of smoking. Best of all, it *adds little to the cost of the completed fireplace.* It provides all the vital parts of the fireplace . . . saves the cost of a separate damper, firebrick and masonry otherwise required . . . and on most jobs reduces time and labor.

CUTS FURNACE OPERATION . . . Makes furnace fires unnecessary on cool Spring and Fall days. Use it to supplement furnace heat during bitter weather. In mild climates it furnishes all the heat needed by many homes.

PROVED BY 24 YEARS USE . . . Get the one fireplace unit that has proved itself in thousands of homes for 24 years.

Look for the name "Heatilator" on the dome and damper handle of the unit you buy. Accept no substitute. See it at leading building material dealers everywhere.

Basement Rooms — Summer Camps

*Heatilator is the reg. trademark of Heatilator, Inc.

HEATILATOR FIREPLACE

HEATILATOR, INC.
681 E. Brighton Ave., Syracuse 5, N. Y.

Please send free booklet showing pictures and advantages of the Heatilator Fireplace.

Name.....

Address.....

City..... Zone.... State.....

FREE CATALOG

23 MODELS-SAVE 50%

16' Sport Cruiser $330

★ EASY TO ASSEMBLE

PACKAGED BOAT KITS

WORLD'S BEST BOAT BUY!

CUSTOM-CRAFT
★SEMI-FINISHED BOATS (READY TO PAINT)
★CUSTOM-FINISHED BOATS (READY FOR THE WATER) FACTORY TO YOU

Exclusive features. Top-grade materials. Precision cut and pre-assembled parts. Advanced design. Top performance.

Kit prices approx. - F.O.B. Buffalo

BOAT PLANS - PATTERNS

Over 50 modern plans and full size patterns. Racing classes, cruisers, inboards, outboards, sail — by famous designers. 6'-30'. CATALOG 35¢. Catalog and boat building handbook, $1.00

BOAT HARDWARE

Send 10¢ for literature on small boat hardware, paints and finishing materials. Literature and book "How to paint your boat" 35¢.

MARINE MART
Dept. 51
BUFFALO 7, N. Y.

MIRACLE TOMATO Yields 2 BUSHELS To a Vine

Now—You can grow the world's most amazing Tomato right in your own garden and get from 2 to 3 bushels of delicious, ripe tomatoes from every vine.

BURGESS CLIMBING TRIP-L-CROP

TOMATO grows 16 to 20 feet high. Huge, meaty, solid fruit, wonderful flavor. Some weigh as much as 2 pounds each. Unsurpassed for canning and slicing. Blight free—drought and disease-resistant. Grows in any garden Outyields all other varieties.

TRIAL PACKET 10¢
3 For 25c POSTPAID
ORDER TODAY

Write for FREE complete Catalog listing many unusual Seeds, Plants and Bulbs.

BURGESS SEED & PLANT CO.
207 B. Galesburg, Mich.

NEW CHEMICAL MITT

Sensational! DRY Window Cleaner! Uses no water, no messy liquids. Chemically Treated. Simply glide over windows; leaves glass sparkling clear. No hauling water, no heavy buckets to carry. No rags, powders, sponges, chamois. No mess or muss. No red chapped hands. Dust, dirt, grime, fog disappear like magic. *Wonderful for auto windows, windshields!*

SAMPLES TO INTRODUCE Sample offer sent immediately to all who send name at once. A penny postal will do. SEND NO MONEY. *Just your name.* KRISTEE CO., Dept. 701, AKRON 8, OHIO.

COMET ROADSTER
READY NOW! NEW LOW PRICE!

WORLD'S LOWEST PRICED TRANSPORTATION

AVAILABLE READY TO RUN OR KIT FORM

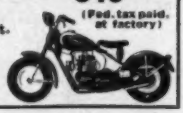
The world's foremost manufacturer of midget autos offers you this *special roadster* that has all the qualities of larger cars . . . at *low* DIRECT-FROM-FACTORY price! You can drive it for as little as 50c a week. Assemble yourself at home if you wish . . . or buy complete *ready-to-drive.* Send 25c for completely illustrated literature describing all details.

- 60 miles per gallon
- 40 miles per hour
- 2 passenger
- Powerful 6 H.P. engine
- Auto-matic drive
- Heavy duty brakes
- Oversize balloon tires

COMET MANUFACTURING CO.
BOX 1882, DEPT. 21 — SACRAMENTO, CALIF.

Mustang

LIGHTWEIGHT
Now Only $346.30
(Fed. tax paid at factory)



9.5 hp. 4-cycle. 3-speed. Foot-shift. Over 70 miles per gal. Over 60 m.p.h. Write for free circular.

MUSTANG, Dept. GP-70
635 W. Colorado, Glendale 4, Calif.

ELECTRIC MOTOR BARGAINS!

Every Motor Fully Guaranteed

1/4 HP	1750 RPM 110 Volt 60 Cy. Split Phase Type	$	7.50
1/3 HP	1750 RPM 110 Volt 60 Cy. Capacitor Type		14.00
1/2 HP	3450 RPM 110 Volt 60 Cy. Capacitor Type		15.00
3/4 HP	3450 RPM 110/Volt 60 Cy. Repulsion Induction		29.75

DOUBLE SHAFT MOTORS AT 50% SAVINGS

1/6 HP—$8.50 1/4 HP—$9.00
1750 RPM Split Phase 1/2"x3" Shafts

1/3 HP—$11.00
1750 RPM Split Phase 5/8"x3" Shafts

All new. Resilient mounted for quiet operation on 110-V 60-Cy. AC current. Ideal for Blowers, Grinders and Tool layouts. Special discount for quantity orders. All prices F.O.B.

ROBERTS ELECTRIC CO., 7232 Madison, Forest Park 11, Ill.

New television microphone, developed at RCA Laboratories, virtually vanishes when in active use.

Vanishing Microphone lets the stars shine

Now you see it, now you don't! RCA's new "vanishing microphone" is plainly visible when standing alone—but let a television performer stand before it and it seems to disappear.

Called the "Starmaker," this RCA microphone is little larger than a big fountain pen . . . and principles of modern camouflage design blend it with an artist's clothing. There's no clumsy "mike" to distract your attention from the artist—and it's also a superbly sensitive instrument.

Through research carried out at RCA Laboratories, the "Starmaker" microphone picks up sound from all directions—hears and transmits every sound the human ear can detect. It's not only small and almost invisible, but it's also one of the most efficient microphones ever devised.

* * *

See the latest wonders of radio, television, and electronics at RCA Exhibition Hall, 36 West 49th Street, N. Y. Admission is free. Radio Corporation of America, RCA Building, Radio City, New York 20, New York.

Known for brilliant pictures, RCA Victor's 1951 home television receivers also have the finest of sound systems—RCA Victor's "Golden Throat."

RADIO CORPORATION of AMERICA

World Leader in Radio — First in Television

The "Star" of the Show!

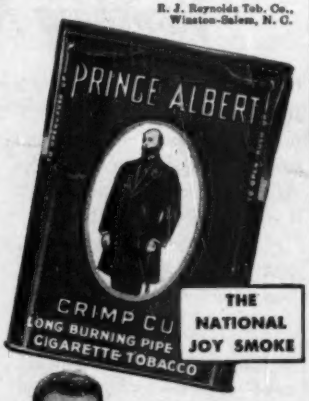
He's got P.A.

P.A. means PIPE APPEAL and PRINCE ALBERT

● Yes! He's the "star" of the show for her! He's got Pipe Appeal! And the tobacco that stars with pipe smokers is crimp cut Prince Albert — America's largest selling smoking tobacco.

Try P. A.! You'll enjoy the natural fragrance of Prince Albert's choice, rich-tasting tobacco — specially treated to insure against tongue bite.

R. J. Reynolds Tob. Co., Winston-Salem, N. C.



THE NATIONAL JOY SMOKE

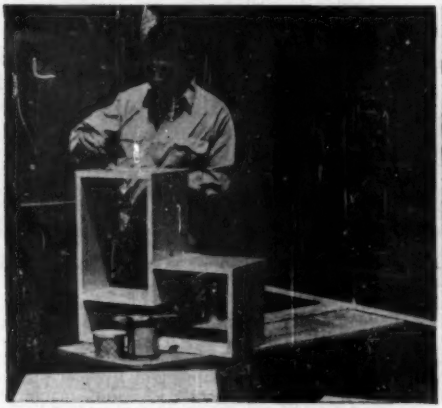
"GRAND FOR ROLLING YOUR OWN CIGARETTES TOO!"

Popular Science *Highlights* This Month

Shaw Tries the '51 Pontiac. PS's driver's-seat reporter takes the new model—and you—over the humps at GM proving ground. **Page 109**

Field Artillery: Modern mass destruction on wheels gets its potent punch from this deadly array of assorted shells. **Page 124**

How Your Telephone Is Installed. There's more to it than connecting wires. Here are tricks the phone men use for a neat job. **Page 117**



One Bookshelf That's a Dozen. That's what you get when you build these simple sectional units that can be arranged any way you like. **Page 219**

Your Home Needs These Tools. Kept in good working order, they'll save both time and money. And here's how to care for them. **Page 198**

How Deadly Are the Russian Jets?

Plenty, according to this intelligence estimate. They're soundly built, very fast. Some may be better than our own.

By William S. Friedman

DRAWINGS BY JO KOTULA

IT IS no secret that the Russians have a jet air force in the making. The question is, how good is it?

The USSR has only hinted at what it's doing. Ever since World War II Red jets have been flaunted before foreign diplomats in the great Moscow military demonstrations on May Day. Red Star fighters without propellers have ripped over Berlin now and then. They have been seen off Bering Strait, where the farthest finger of Alaska almost touches Asia. The occasional encounters between U. S. planes and Russian-designed jets over Korea so far have disclosed few significant details.

But it is possible, using the techniques of military intelligence, to put together bits and pieces into a fairly good picture of Russia's growing jet air force.

From pictures and descriptions in foreign journals—including some from behind the Iron Curtain—from private sources in England, France, Holland, Sweden, Hungary, Finland, and Roumania, much illuminating information can be put together.

Here's how these conclusions shape up:

1. Russia is well abreast of the rest of the world in ultra-fast military aircraft.

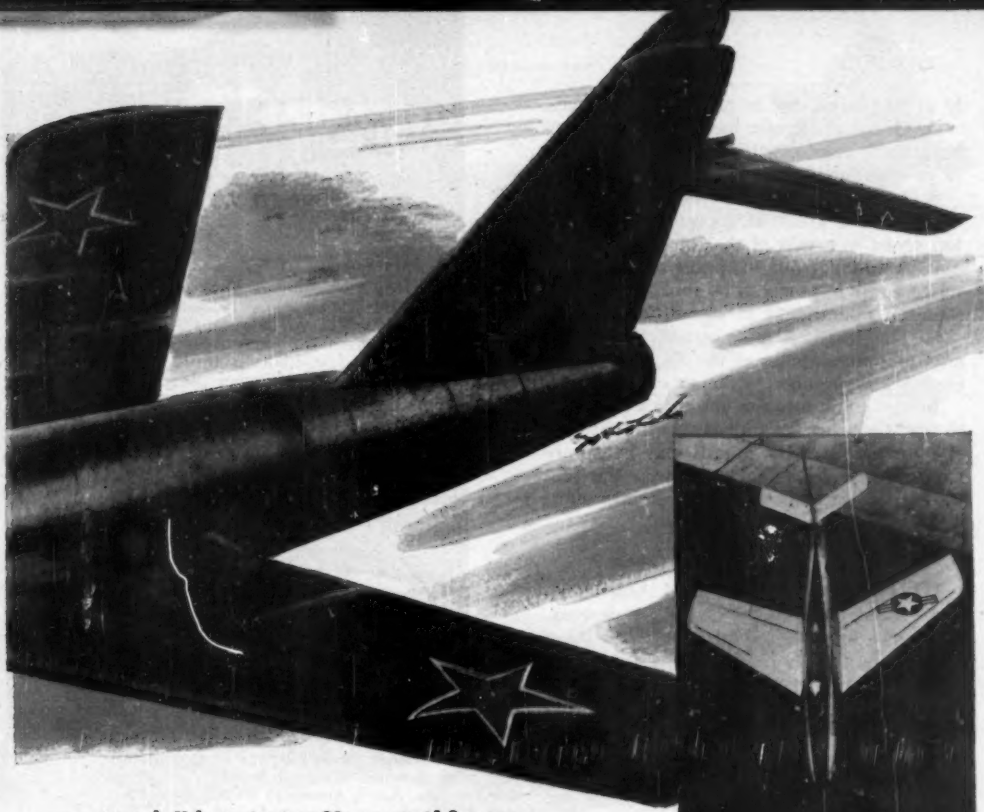
2. In at least one type of plane the Russians are ahead of the United States.

3. The USSR jet air force is big, far bigger than ours.

4. Red fighter strength is invested main-

The most advanced design in operational Russian fighter planes probably is Yak-25, which may be compared with our Republic F-84F jet, formerly called F-96 (inset). Each can do over 650 m.p.h. Thrust is practically identical—5,300 lb. for the U. S. fighter; 5,200 for the Yak. F-84F weighs 12½ tons. Yak weight is unre-

Yak-19 jet fighter (right) stacks up against U. S. Republic F-84E. Each does over 625 m.p.h., and weighs around 10 tons. F-84 (above) is powered by Allison J-35 turbojet rated at 5,000-lb. thrust; Yak, by Chelomey engine of similar thrust, adapted from British Rolls-Royce Nene. Armament of Russian plane is two 32-mm. cannon, two 12.7-mm. machine guns, plus rockets or bombs, compared with six .50-cal. machine guns plus 4,000 lb. of rockets and bombs for U. S. fighter. This Yak bears tes-



ported. Yak carries two 32-mm. rapid-fire cannon. F-84F's armament is confidential. Yak is being delivered in strength to USSR first-line guard squadrons.

timony to fact that Russian designs at least keep pace with developments in other countries, and here and there take the lead. Yak-19 is reported in major production. For two years fighter squadrons have received them in quantity.

Designer of Yak series is Alexandre Yakovlev, most prolific producer among Reds' aircraft engineers.

ly in jet planes, not in piston-engined ones.

5. One night fighter has the sharp sweepback wing characteristic of planes capable of penetrating the speed of sound.

6. A rocket fighter, for the local defense of important areas, is reported to have a top speed in excess of that of sound.

7. A 40-ton ground-support and medium-range bomber, powered by four turbojets, is reported operational in squadron strength.

8. The Russians are not known to have anything comparable to the U. S. B-47 six-engine superbomber in the jet classification.

Before going into the details it's pertinent to note than any resemblance between U. S. and Russian military aircraft may be purely coincidental. The comparisons in the pictures on these pages are not to show similarity but to point up contrasts.

Copycats All

If the Russians have copied American—and, more extensively, German—designs, they have done no more than we have done in borrowing freely from the British and the Germans. It was Britain, not the United States, that designed the first practical gas turbine engine for airplanes. It was Germany, not the United States, that produced the first rocket airplane.

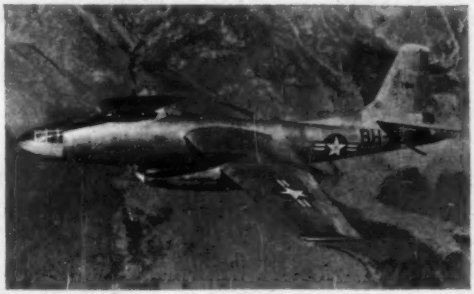
The most important fact of the Reds' jet air force is the type of planning that has governed its growth. At the close of World War II Russia was behind the U. S. technically in the air. In the intervening five years Russia has expanded her air potential while, until recently, we contracted ours.

The Russians have planned most of their air force as defensive and offensive support for the immense Red army. For a time this planning was at the expense of a strategic section capable of delivering bombs on a distant enemy. This no longer is true. Today the Russians are as much alive to the need for long-range bombers as we are.

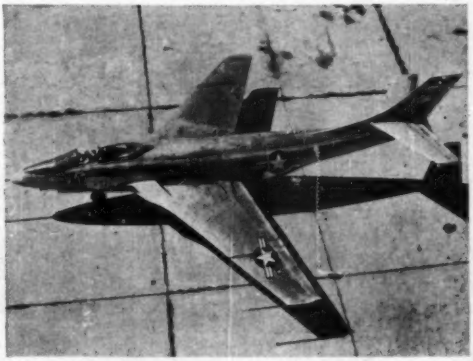
The Red *jet* air force is not, of course, designed for strategic air warfare—for flying thousands of miles to deliver a load of bombs on an industrial target to quench an enemy's capacity for producing war materials. Jets don't have that range. Like ours, the Red jets are for relatively short-range flights—for the defense of their homeland and of satellite nations, and for establishing air superiority over a battlefield.

Sheer numbers make the Red jets formidable. Authoritative reports for the year 1948 gave Russia no less than 16,000 opera-

Counterpart of most famous U. S. jet fighter, Lockheed F-80 (above), is Russian MiG-9 (right). The two planes weigh alike—about 7½ tons—but whereas F-80 is powered by one Allison engine rated at 4,600-lb. thrust, MiG-9 has two Chelomeys. But Russian plane's total thrust just about equals American plane's. MiG's top speed is more than 550 m.p.h. as



U. S. and Russia have comparable ground-support and medium-range jet bombers in 40-ton weight class. North American B-45 (above) has four GE turbojets compared with four Chelomeys in Reds' Il-16 (right). Top speeds of each is over 550 m.p.h.; armament of neither has been published. Span and length of two planes are about the same. B-45, with two en-



First Russian night fighter to be built is La-16 (right), compared here with U.S. McDonnell F-88 (above). Not a heavy plane, La-16 has wing sweepback characteristic of machines capable of transonic speed. F-88 also is fast—Air Force says "over 650 m.p.h." Russian plane's two Chelomey engines, with 4,000-lb. thrust each, are more powerful than U.S. fighter's.

compared with F-80's 580. Armament differs. F-80 carries four 20-mm. cannon, rockets, bombs. MiG totes one 32-mm. cannon, two 12.7-mm. machine guns, rockets, bombs.

MiG stands for designer team of Artem Mikoyen (inset), Mikhail Gurevich.

gines enclosed in each of two nacelles, is not operational in U. S. Air Force. Russian plane, carrying crew of five, is reported in squadron strength. Design was observed as early as 1947.

Il is symbol for Designer Sergei Ilyushin. His best known plane, Il-2 Stormovik, was awarded prize.

Armament is similar: four 20-mm. cannon, plus rockets or bombs. La-16 is a modernization of German Me-362 fighter that was on drawing boards when Nazis capitulated.

La stands for Semyon Lavochkin, designer of plane that won air command over Stalingrad.

tional aircraft. Of that number, 9,000 were rated as first-line machines. How many were jets is problematical, but the chances are that the number was inconsequential: the Russians were slow to convert to jets.

In 1948 the U. S. had 11,500 operational military planes.

The following year it was a different story. The USSR is reported to have produced 25,000 planes, of which 5,000 were jet fighters. Significantly, they manufactured only 2,500 piston-engined fighters.

We made only 2,500 military planes in 1949.

In 1950, according to the best dope available here, the Russians made fewer planes than in 1949—but a greater tonnage. They, too, are now going in for multi-engined long-range bombers. But it's safe to say that jets figured prominently in the total.

The Reds haven't confined themselves, any more than we have, to single-engine jet fighters. They picked the brains of the German Messerschmitt engineers after the war and adapted the twin-engine Me-262, an outstanding plane, to their own needs.

Reds Also Have Jet Bombers, Attack Planes

Nor does Russian jet production end with fighters. It covers light bombers and attack planes too. Less is known of them.

The Tu-64, powered by two turbojets, is designed for ground support, but information on its actual performance is meager Its reported top speed of 450 m.p.h. leaves something to be desired. More important tactically is the Il-16, a four-jet ground-support and medium-range bomber. Reported in operation in squadron strength, it compares well with its American opposite number.

In finish and quality the U. S. still leads Russia. But spit and polish alone never won a war. In aircraft design the Reds have nothing to apologize for. They do, however, appear to lag behind the U. S. and England in aircraft gas-turbine design. Russian electronics shows signs of being poor, but an influx of German and Czech technicians should make up that deficiency in time.

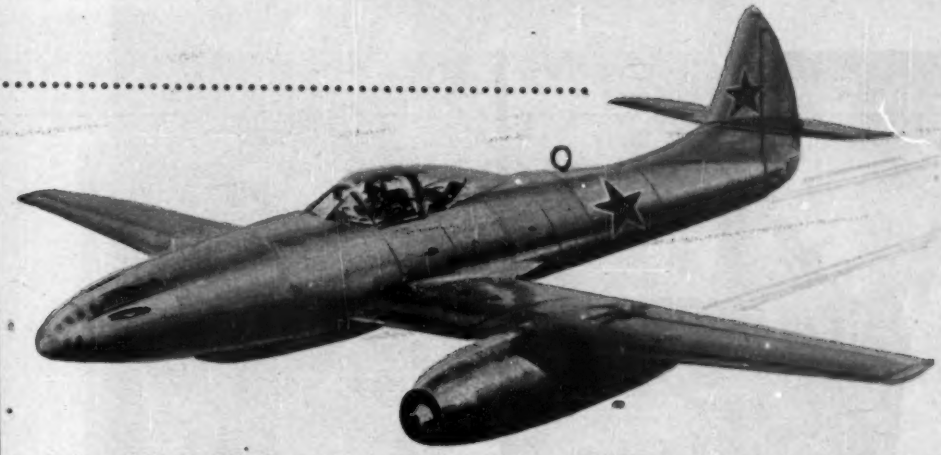
Undeniably, in a Soviet air force consisting mainly of fighter aircraft, light bombers, and attack planes the underlying influence is German. In operational theory, it is the organization that a group of German experts, trying to lay the foundation for a future Luftwaffe in defiance of the Treaty of Versailles, created *for the Russians* as far back as the early 1920s. The German influence was accentuated by the importation of German engineers (and some military tacticians as well) after World War II.

Still another comparison is in field of true twin-jet fighters, capable of operation on either of two engines. Russians seized on German Me-262 and adapted it to La-15 design shown at right. U.S. Air Force evaluation teams urged us to do the same, but it was late 1947 before we had a plane equaling German machine in performance. Estimated weight of La-15 is 11,900 lb. compared with about 14,000 for its U. S. opposite number, Navy's McDonnell Ban-

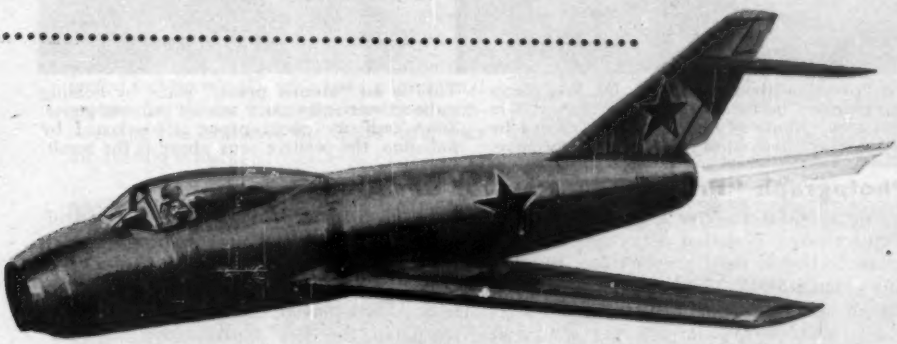
In jet day-fighter category, one of Russia's hottest is Mi-1 (right), using a 40° sweepback on wing—5° more than on fastest U. S. service plane. In performance it compares with North American F-86 above. Speeds of both exceed 650 m.p.h. F-86 is powered by GE engine rated at 5,200 lb. thrust; Mi-1 (widely mislabeled MiG-15), by Chelomey-Nene engine rated at

It was the Germans who ignored long-range bombers before 1939. It was the Russians, as disciples of the Germans, who ignored strategic bombers until quite recently. The Reds, in fact, put Andrei N. Tupolev, dean of Soviet airplane designers, in the doghouse for several years—and at least one factor was his advocacy of long-range bombers. He's back in favor now.

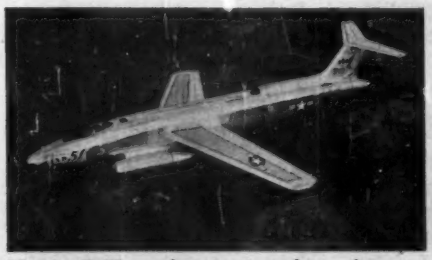
If the predominant influence on the Russian jet air force is German, for our own safety's sake let's not sell the Russians short. The Germans were pretty good. END



shee (left). La-15's power is two Chelomey axial jets of 3,700-lb. thrust each; Banshee's is two Westinghouse J-34 jets rated at 3,000 lb. Top speed of both planes is over 600 m.p.h. Armaments are secret. Czechoslovak publication *Letecvi* indicates La-15 has system for restarting engines in flight. U.S. is said to also have a system for re-firing jets.



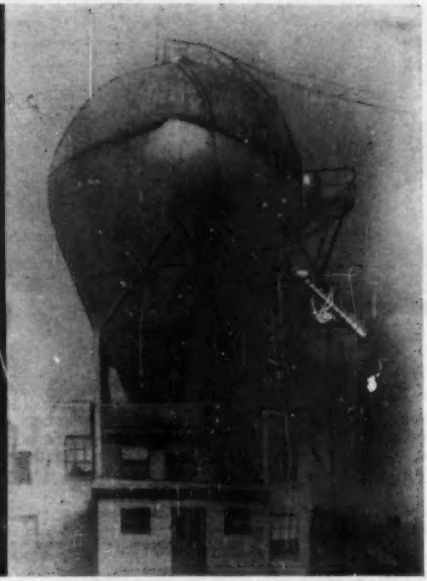
5,500-lb. thrust. Red plane's armament includes two repeater-type launchers for 40-mm. rockets. F-86's is four 20-mm. cannon, plus rockets and bombs. Russian rocket launchers can shoot spin-stabilized, 40-mm.-diameter rockets in rapid succession. Recently it was disclosed that U. S. has developed repeater rocket tubes for operational aircraft.



Martin B-51, a three-engine plane of exceptional performance, is more truly representative than B-45 of ground-support jets in U.S. The B-51 is not yet operational, but Russians have nothing like it. Their nearest plane is two-engine Tu-64, reported to have a top speed of only 450 m.p.h. Red plane is a variant of propeller-driven Tu-2, which carries bomb load up to 2½ tons.

U. S. has nothing, on the other hand, like Russians' Yak-21, developed from German Me-163 rocket interceptor (shown above)—used by Luftwaffe to attack our Flying Fortress formations. Russian rocket-driven planes are reported assigned in moderate strength to local defense units. Capable of transonic speeds, engines use fuel mixture of gasoline and nitric acid.

To "print" with atomic rays, Dr. Sun places transparency between wax blocks, puts this in cyclotron. Neutrons from cyclotron, slowed by wax, make photo's silver atoms radioactive.



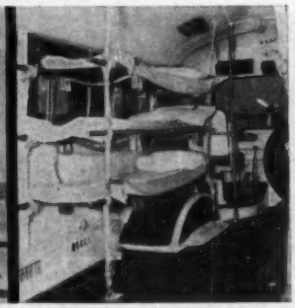
This is an "atomic print," made by holding radioactive transparency against printing paper. Since ordinary photo paper is blackened by radiation, the positive copy above is the result.

Photograph "Printed" by Rays of Big Atom Smasher

PHOTOGRAPHERS have a new way to copy pictures now. Not that many are likely to adopt it—they'd need a cyclotron. But Dr. Kuan-Han Sun, Westinghouse physicist, had one of these huge atom smashers handy, and he used its rays to print the picture at right above, probably the first of its kind.

Dr. Sun placed a positive transparency—made in the ordinary way—inside the University of Pittsburgh cyclotron. Bombardment with neutron particles made the silver atoms in the transparency mildly radioactive. When placed against a sheet of printing paper, the "hot" transparency "exposed" the print. Since radiation darkens photo paper, a positive print results.

Army Converts Inter-City Buses into Big Ambulances



SIX inter-city buses already on the production line have been transformed into giant ambulances for the Air Force. The rush job—completed in six weeks—was engineered by the Army Ordnance Corps. The big ACF-Brill buses were fitted with rear doors (above, left) to simplify loading from planes. Each carries 18 litters (right).

Reel Removes Bomb's Fuse Safely

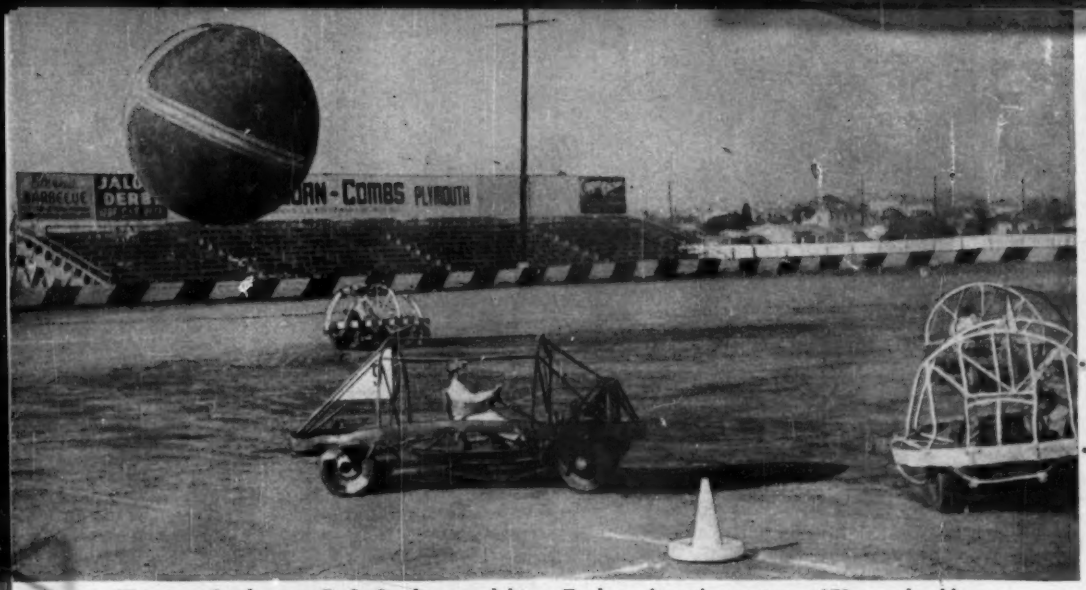
THE circular device being attached to the bomb above by a West Berlin police officer is a new defuser that takes some of the danger out of disposing of unexploded bombs. After it is fastened to the bomb's fuse, the operator—from a safe distance and in a protected location—pulls on a steel wire wound around the drum. This spins the drum, unscrewing the explosive tip. If the fuse goes off, no one is hurt.

Detachable Roof Converts Convertible to Winter Hardtop

THIS lightweight, auxiliary roof quickly converts a convertible into a hardtop for rough winter weather. After the car's regular top is lowered, Add-A-Top is lifted into place and bolted on, using existing holes. Made of rigid Fiberglas, the top has a large plastic rear window. It can be installed in five minutes. Rubber insulation around the edges seals out wind and rain. Add-A-Top Co., of Detroit, makes it in several sizes.

Tree-Eating Truck Helps Linemen

A TREE-EATING truck, used by crews of the Ohio Edison Electric Co. for trimming trees along power lines, simplifies the job of disposing of bulky brush. As men cut branches, others feed them into a hole in the side of the truck. Inside, three rapidly revolving steel blades chew the brush to shreds. The chips are then blown into the bed of the truck for storage and later disposal as mulch.

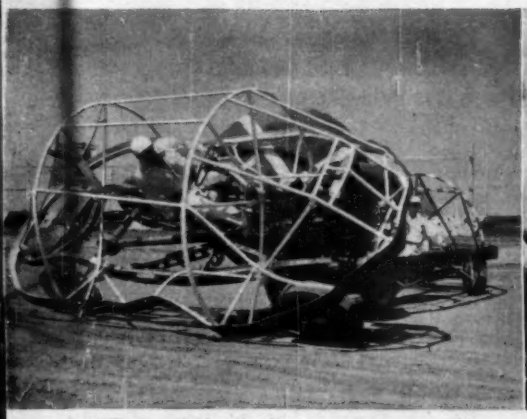


This is polo the way B. J. Goodman and his California "Moto Polo" teams play it. Cut-down Fords replace the ponies; a 173-pound rubber ball subs for the traditional small white one.

Hot Rods Play Polo

POLO, the 2,000-year-old sport of playboys and princes, has been taken over by the hot-rodders. In California, four teams are playing a hopped-up version of the game from armored jalopies. They've discarded the mallets and are using the cars themselves to bounce around a 173-pound rubber ball 80 inches in diameter.

Moto Polo, as it's called, is a fast, rough sport. Cars race around the field, sideswiping, colliding, overturning. There are only



Battered No. 5 rolls over when rammed by another car. Referee—whose orders need not be obeyed by players—often does this to enforce a ruling and get a player off the field.

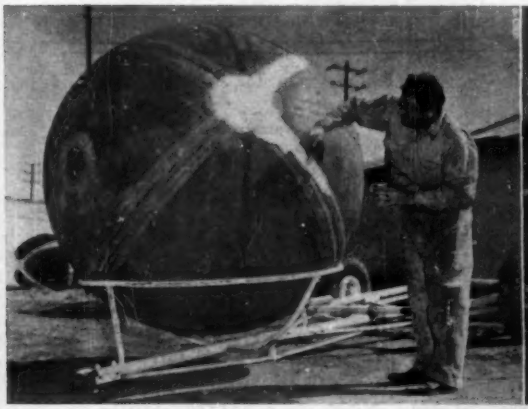
The game is rough, but injuries are rare. Driver has safety strap holding him to seat (above) and rail to grab during upset. A shield keeps battery acid and gas from spilling on him.

Above you see the reason for the canopy of steel pipe fastened to the jalopies. There are plenty of collisions as players fight for the ball, and the cars roll over regularly.

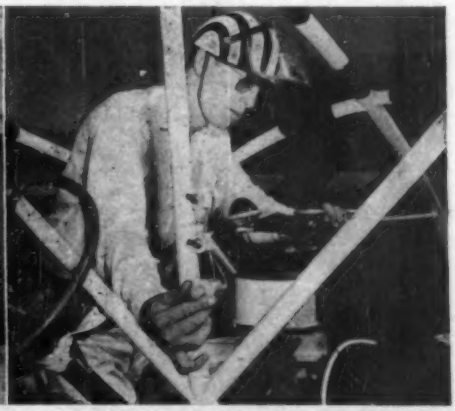
two rules: no head-on collisions, and each goalkeeper must stay on his half of the field. Players don't even have to obey the referee—he must crowd rule-breakers off the field. Yet injuries are rare.

The cars—three to a side, plus a couple of spares—are stock '36 or '37 Fords with standard gearing. But the bodies have been ripped off and replaced with a cage of one-inch steel pipe, welded and bolted to the frame. A tough steel band, eight inches wide and ¼ inch thick, circles the chassis for a bumper. Wire wheels, which take side bumps better than disks, rubberized cloth to shield the driver from spilling battery acid and gasoline, and safety grips and straps for the driver complete the conversion. The referee uses a similarly modified jeep.

These jalopies can do anything a polo pony can—and then some. Careening along in second gear, they can roll over or turn end over end and come up for more. END



Huge ball, striped with white paint for visibility during night games, is nearly seven feet in diameter and costs $65. It rides to meets on the special trailer supporting it in photo above.



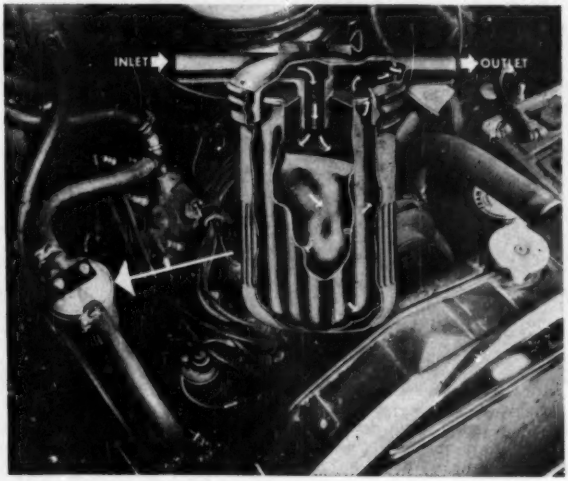
Striped helmet identifies the referee (above), who drives an armored jeep. The signal lights tell the timekeeper when a quarter starts, when play is on, and when time is out.

Deck Landing Shows A-Bomb Planes Can Be Carrier-Based

CARRIER aircraft can now wield the A-bomb. Above, for the first time, a plane that can deliver it alights on a carrier deck. The craft is the Navy's new AJ-1 attack bomber; the carrier, the 45,000-ton U.S.S. *Coral Sea,* one of the Navy's three largest. The plane has two piston engines, plus a jet engine aft for extra speed in combat.

"Visor" Built into Windshield

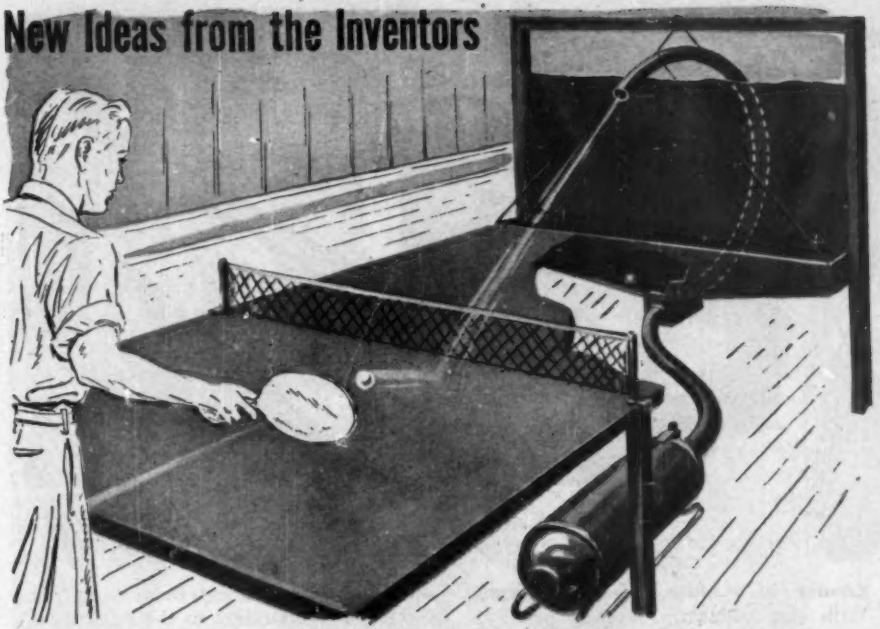
THE shaded windshield at left above wins the decision over the unshaded one, if the girls' expressions mean anything. Optional in Buick's Roadmasters and Supers, the new Libby-Owens-Ford glass has a deepening blue-green tint above eye level. This built-in "visor" cuts out overhead glare and heat. No outside visor is needed.



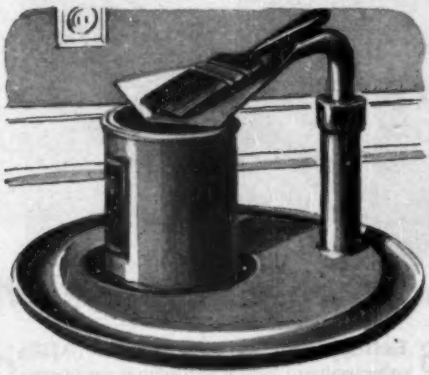
Car Filter Cleans And Softens Water

HARD water is chemically softened by a new filter for a car's cooling system, preventing scale deposits that cause clogging and overheating. The filter also removes rust and other foreign matter. Shown installed at left, it is normally connected to hot-water heater lines, so that a controlled amount of water constantly flows through a chemical cartridge inside it (cutaway drawing). Made by the Fram Corp., Providence, R.I., the filter retails at $8.14 and replacement cartridges at $1.68.

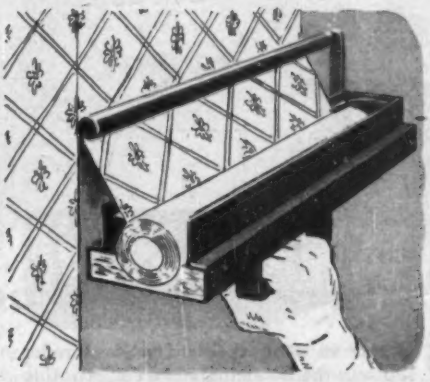
New Ideas from the Inventors



1 Vacuum to Run Ping-Pong Trainer. Set up at the far end of a table-tennis table, this training device is designed to serve up balls to help a player practice returns. Air from the blower end of a tank-type vacuum cleaner powers the unit. Returned balls, falling into a collecting trough, are fed, one by one, into a curved air gun that shoots them onto the table to simulate serves made by an opponent.



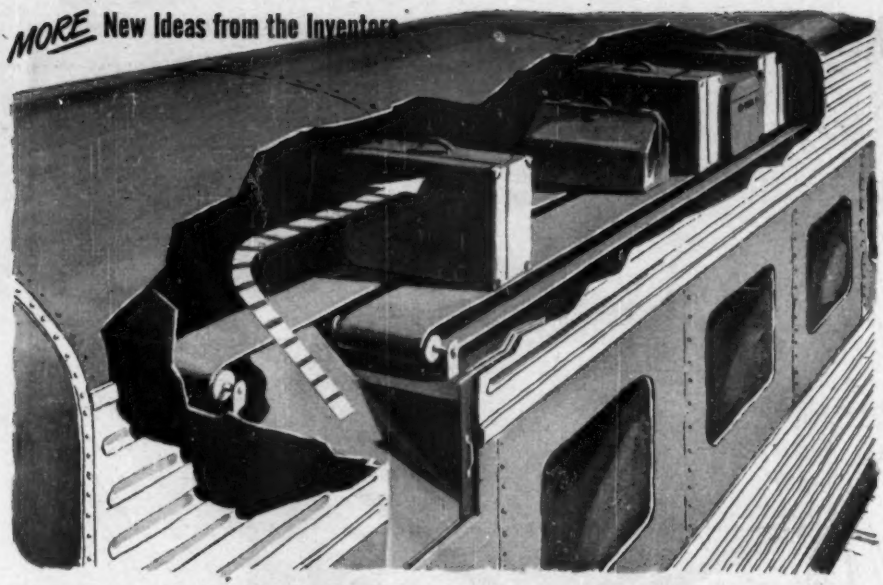
2 Can Holder to Catch Paint. A small can of paint would be easier to handle if mounted in this combination can and brush holder. The brush holder, which also serves as a handle, clamps the can down against a traylike base. Any drippings are caught by the base, while the brush holder directs excess paint back into can.



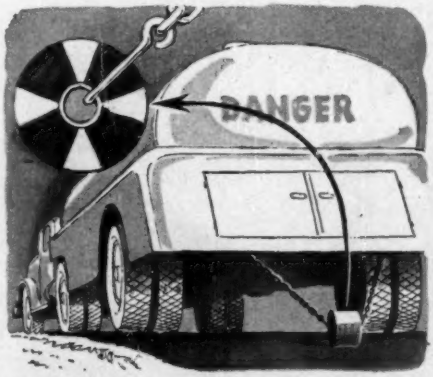
3 Machine to Hang Wallpaper. Wallpaper is rolled onto the walls with this hand-held applicator. The roll of wallpaper, wound wall side out, is held partially submerged in a paste trough. In use, the machine is moved from the top of the wall to the bottom, a roller pressing the paste-coated paper against the wall.

Turn the page, please, for three more new ideas.

MORE New Ideas from the Inventors



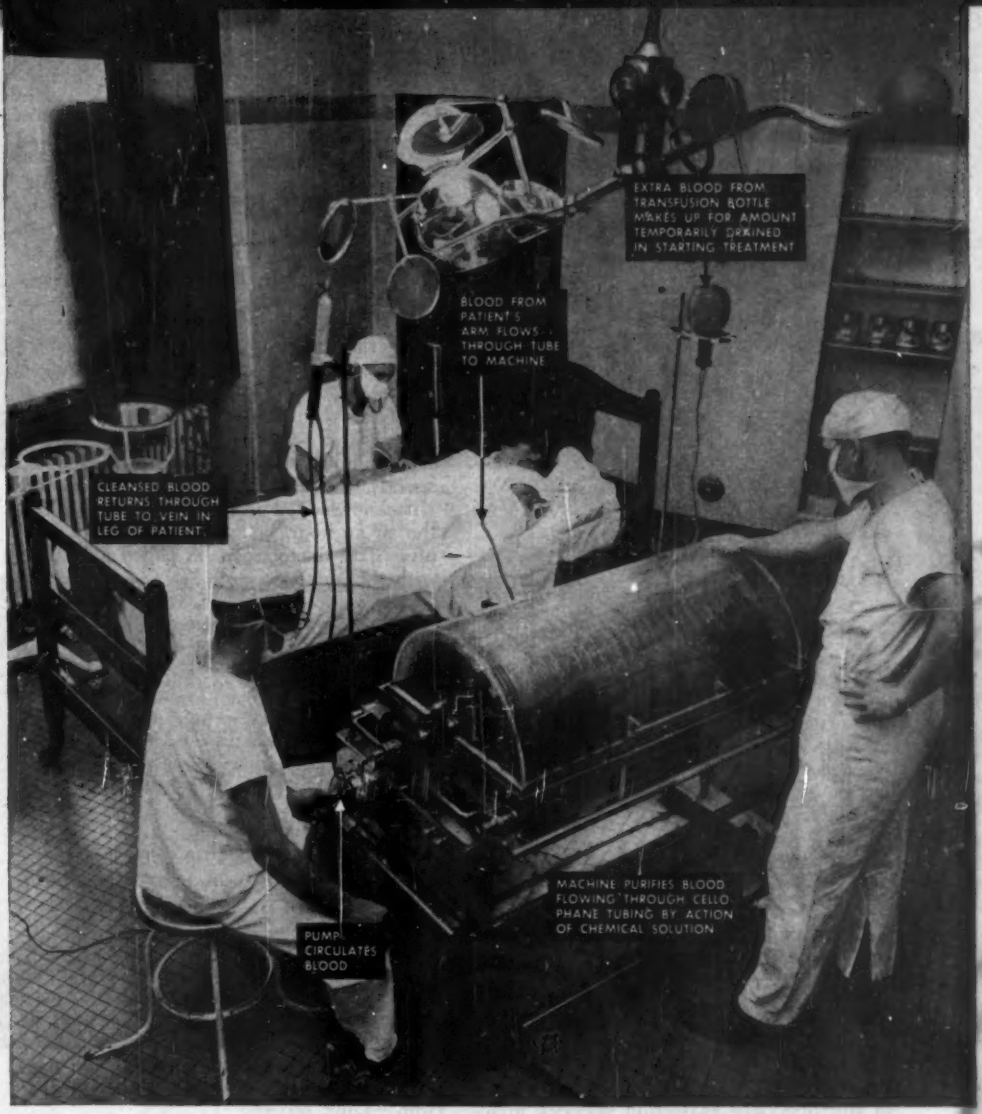
4 Loader to Handle R. R. Baggage. With this automatic baggage handler, luggage is simply pushed up a loading chute near the car door and onto motor-driven conveyers that move it back into an overhead storage compartment. Rearranged later by the porter according to the passengers' destinations, the proper luggage can be discharged at each station merely by operating the conveyer control switches.



5 Roller to Ground Gas Truck. A roller replaces the bouncing metal chain in this grounding device for gasoline trucks. The roller, a cylinder of long-wearing insulating material such as rubber, has a network of metal fingers extending through it to make electrical contact between the truck and the road.

6 Extinguisher to Use Powder. Made principally of heavy cardboard, and using a powdered rather than a liquid compound, this fire extinguisher is designed for low initial cost. Its telescoping tubular body is extended and compressed alternately to operate a bellows pump that blows the chemical on the fire.

Patents on these inventions have been granted to: 1. G. Lemon, Youngstown; 2. M. Worthington, Drexel Hill, Pa.; 3. I. Bodell, Fremont, Neb.; 4. F. Murphy and F. Vander Linden, Chicago; 5. C. Criss, Arkansas City, Kan.; 6. T. Weiss, Oklahoma City, and S. King, Bethany, Okla.



Machine Cleans Blood While You Wait

SENDING your blood to the cleaner's is a modern medical miracle. A device called an "artificial kidney" makes it possible. Latest and most advanced of those in use is the Allis-Chalmers machine above, now saving lives at New York's Bellevue Hospital.

When kidneys quit working, their failure to remove impurities from the blood causes acute uremic poisoning. The artificial kidney provides relief by taking over and giving the organs a rest until they can resume their task. A needle taps a patient's artery, and his blood flows through 125 feet of cellophane tubing on a drum that rotates in a chemical solution. Minute impurities pass from the blood to the solution through the permeable walls of the tubing. Then the cleansed blood is returned to the patient. A treatment takes three to five hours. It causes no discomfort, and no anesthetic is needed.

Pocket Radio Pages Doctor Night and Day

By C. Ennis
PS PHOTOS BY HUBERT LUCKETT

THANKS to a new radio paging service, physicians in New York City who carry special pocket receivers can be quickly reached in an emergency. A supplement to the telephone-answering services many doctors use, it can tell a physician almost anywhere in the city that an important message is awaiting him.

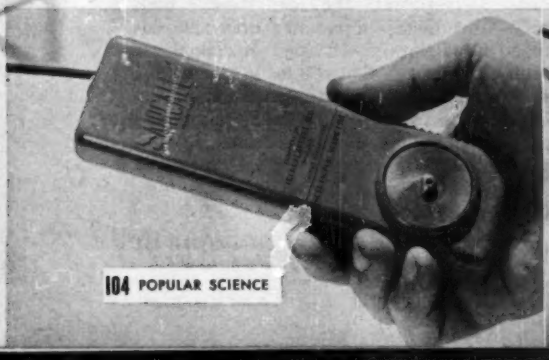
Under the new system, a patient dials his doctor's number. If the doctor doesn't pick up his phone, the service takes the message. Then, if the message is urgent, the doctor's code number is immediately broadcast on a special radio frequency assigned to Telanserphone, Inc. The doctor hears the broadcast through his pocket receiver, which he switches on at least once an hour to listen to a series of three-digit code numbers. When he hears his number he goes to the nearest telephone to find out where he is needed. Once a doctor responds, his number is taken off the air. Unacknowledged code numbers stay on the air an hour, being repeated every minute. Sixty doctors can be paged at a time with this method.

The station that does the broadcasting is KEA627, which operates on a frequency of 43.58 mc. from an antenna 743 feet above sea level.

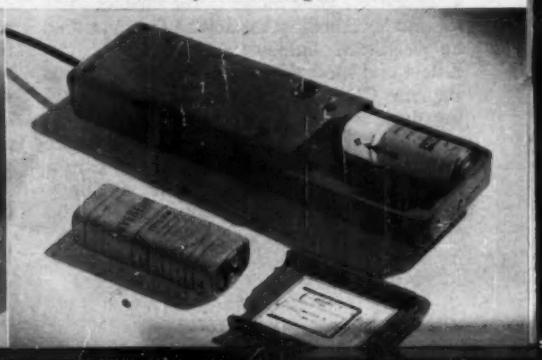
Code numbers are sound-recorded on 16-mm. motion-picture film and encased in plastic sticks. When a doctor is to be paged, his code stick is hung on the endless moving belt of a special transmitting machine. Then, as the stick passes an electric eye, the number is amplified and broadcast. This machine was developed by Reevesound, Co. Inc., of Long Island City, N. Y.

The doctor's portable receiver weighs only six ounces. It gives good reception within a 25-mile radius, and works in buildings, on a golf course, or in an automobile. About the only place where it won't perform is in the subway. Its batteries last about six months. Physicians pay about $12 a month to subscribe to the radio paging service.

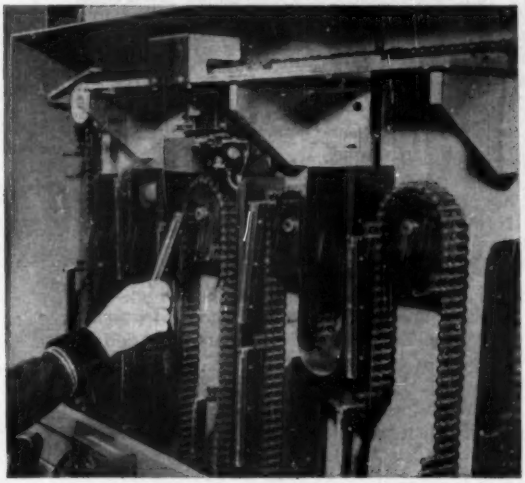
Hardly bigger than a glass case, this pretuned plastic receiver weighs only six ounces, easily fits a pocket. Metal disk near end is the earpiece. Other end has rubber-covered antenna.



Powered by hearing-aid batteries, which last about six months, receiver has 30-volt B supply. Button switch is pressed for listening. Bottom of the case lifts off easily for inserting new batteries.

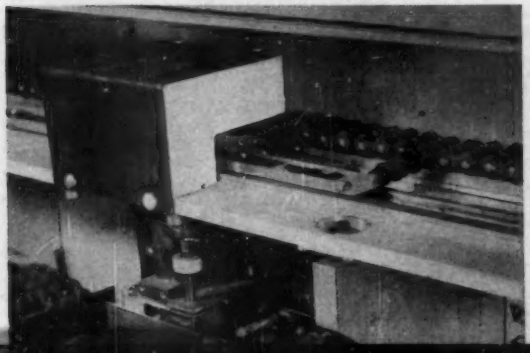


Recorded on 16-mm. motion-picture film, each doctor's code number is encased in a plastic stick. Girl above lifts stick off a filing board to put it on the transmitting machine.



Code stick is hung on an endless chain that moves continuously across the transmitting machine above. Part of the belt can be stopped momentarily to attach the stick.

As stick passes sound head below, similar to that in a sound movie projector, the voice on the film strip is picked up and fed to the transmitter that broadcasts it over the air.



Span Sidles into Place

RACING the clock to cut out-of-service time, workmen rebuilding this bridge over the Ohio River assembled a new 518-foot span alongside the one that was to be replaced. When all was ready, they just rolled out the old span, left below, and rolled in the new one. The bridge is used by the Illinois Central.

"Creep" Totes Fire-Fighting Gear

ROUGH forest trails and brush obstacles don't faze this tracked wagon, developed in Canada for toting 700 pounds of fire-fighting equipment—a stiff load for six men with packs. Powered by a one-cylinder motor, the "Creep" is steered through dual clutches operated by a man walking behind the machine.

Seagoing Sand Dredges Build a Super-Highway

By Walter Hamshar
PHOTOS BY J. WALKER GRIMM

A SUPER-HIGHWAY is being built 118 miles across New Jersey in record time, thanks to the use of ocean bottom for long stretches of the modern eight-lane toll road.

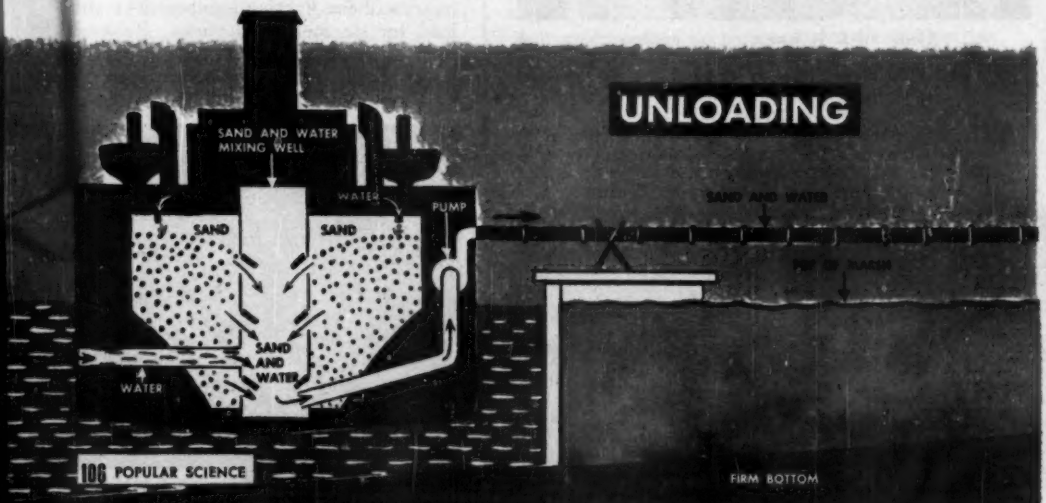
Sand that has been accumulating for centuries on the sea floor off Coney Island and Sandy Hook is being transported 16 miles by a very special kind of ocean-going dredge to fill in right-of-way where the New Jersey Turnpike arrows through mucky swamps. By using this porous material instead of ordinary earth fill, engineers are building a dry roadbed through ooze in a fraction of the time usually needed for fill to settle.

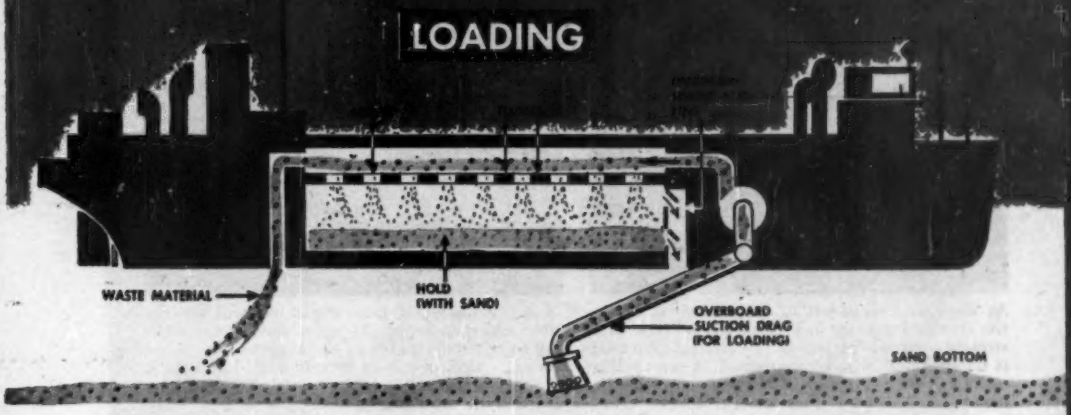
The problem of obtaining astronomical quantities of sand at reasonable cost led Construction Aggregates Corporation, which has contracts for swampy stretches, to design three unique craft from outmoded Army dredges. Instead of performing the ordinary tasks of deepening channels, these ocean-going earth movers now suck up sand from the ocean floor, classify it for coarseness, carry it to a terminal in Newark Bay, and then pump it into 20-inch pipes that carry it up to three-and-a-half miles inland for the road bed.

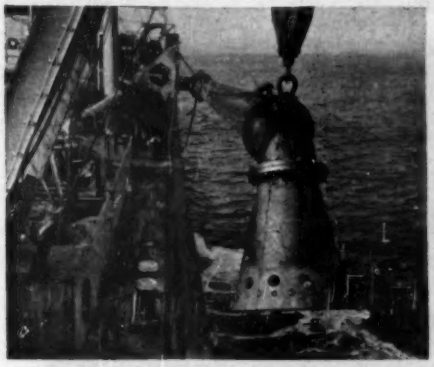
Rebuilt by Bethlehem Steel Company's shipyard in Hoboken, N. J., at a cost of $3,000,000, the dredges were modified in fifty-one days to meet the rush requirements of the job. As the *Sandchief*, *Sandcaptain* and *Sandmate*, they now work round the clock, seven days a week, carrying as much as 4,500 tons of sand in each load.

Each craft makes an average of two trips a day, sailing 16 miles down Newark Bay and Kill Van Kull through New York's Narrows to the ocean. Then anchoring in 30 feet of water along the famous Ambrose Channel, the vessels perform a double function of deepening an important shipway while obtaining their sand cargoes. In two hours the hoppers are filled, and the converted dredge sets out on its three-hour voyage back to Port Newark.

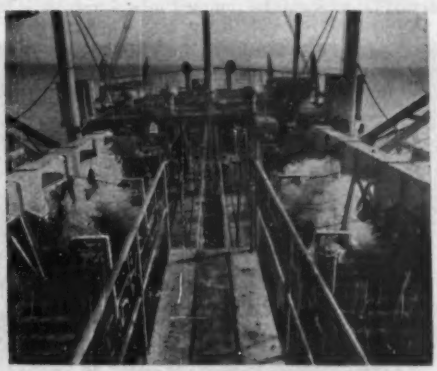
There the vessel's spout is connected to a 20-inch pipe line, and the sand—mixed



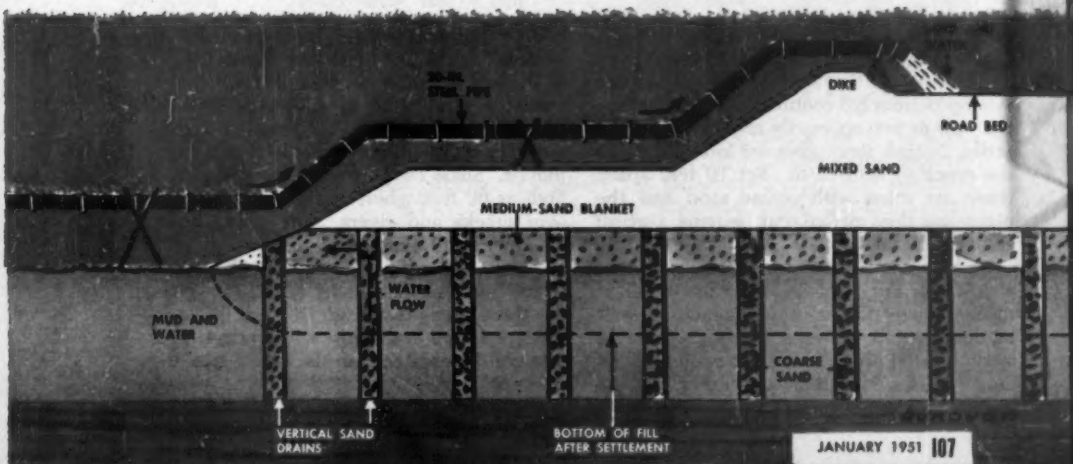




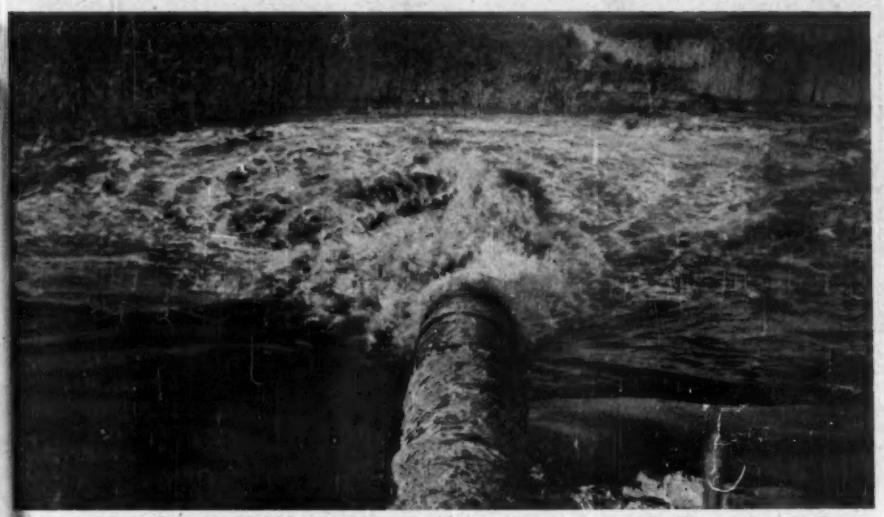
Adjustable drag attached to huge suction pump is dropped from each side of dredge at sea. Ocean-bottom muck pulled up with liberal quantities of water passes through screens that strain out shells, stones, other trash. Crew members watch screen closely: several have amassed valuable collections of old coins that have been sucked up with the sand.



Strained sand and water travel in a flume over ship's big hoppers, the coarsest sand dropping first because of its weight. By regulating flow of mixture through flume, dredge pumps out fine sand—little better for road building than mud already in the swamps—before it can settle into hoppers. As graded sand drops into hoppers, water drains overboard.



At dockside terminal in Port Newark, N. J., the dredge hooks up to a 20-inch steel pipe that stretches inland (right) to the swamp area that is being filled to make a roadbed. A sea cock is opened, and bay water pours into a well in the center of the vessel. This steel, drumlike structure acts as a "carburetor" to mix sand with water again so it can be pumped inland instead of being unloaded into trucks at great cost in time and manpower. As water rises in the well, high-pressure jets around the hoppers force sand through well openings to mix with bay water. Pumps then send it on its way to the swamps, aided by booster pumps along the route to keep the flow rapid enough to prevent sedimentation in the pipe.



At journey's end, some 30,000 tons of sand a day pour over swamp that'll soon be a highway.

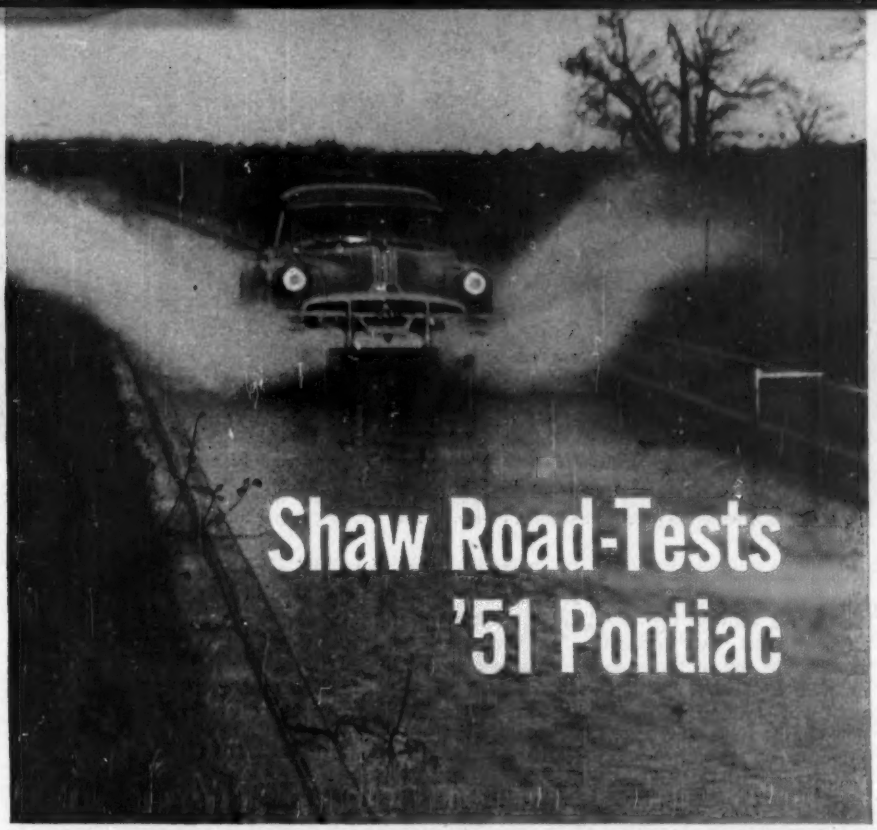
with bay water—is pumped overland to the Jersey swamp as shown in the photos above.

To compress the ooze that has lain on the swamp bottom for centuries without waiting the year or two ordinarily required for fill to settle, 20-inch steel pipes are forced through the muck to firm earth. Set 10 feet apart, these are filled with coarse sand and the pipes are then pulled out, leaving vertical columns of sand.

As water is squeezed in the ooze by the weight of fill, it flows sideways until it reaches these porous drains, which allow it to flow rapidly upward to the blanket of medium sand above. There it drains off. As the fill settles, sand dikes are built along the edge of the road bed to permit finer sand to be used in the last stages of the job.

In one 1.2-mile section, 344,000 cubic yards of sand were used for the blanket, 310,464 sand drains were bored, and 852 cubic yards of other dredged fill were employed. Some of the road fill is pumped as high as 60 feet where bridges will be built over creeks and rivers. The general embankment will average 15 feet.

Almost 10 miles of turnpike will be constructed in this manner by next July. Then the three dredges will go to work filling in swamps for an extension of Newark Airport that will be greater than the entire area the field now covers. END



Shaw Road-Tests '51 Pontiac

I made three passes through this water trough before I got any moisture on the car's floor.

By Wilbur Shaw

PS PHOTOS BY HUBERT LUCKETT

REPORT FROM THE

DRIVER'S SEAT...

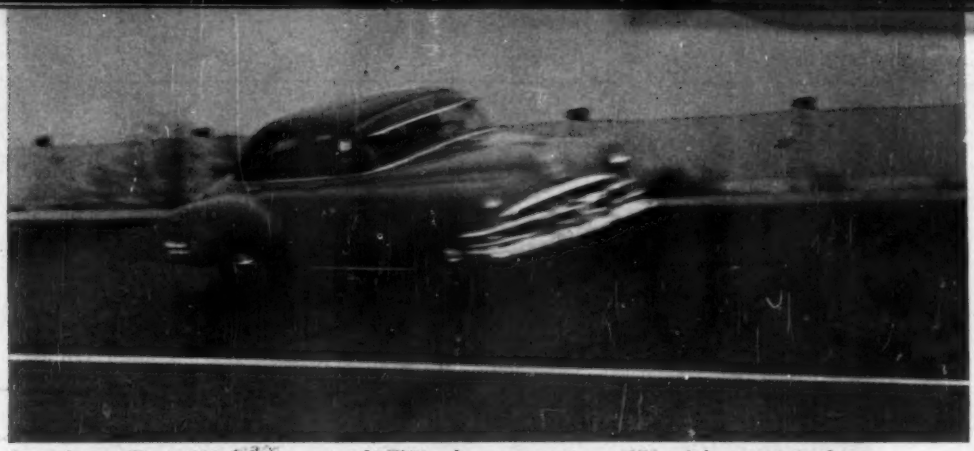
TWO things struck me when I sneak-previewed the 1951 Pontiac—a smoothed-out Hydra-Matic and a fine rough-road ride.

Basically, Pontiac looks the same as in '50. It has the lines of a dependable family car that the Missus drives to the grocery. Only the de luxe models have the color and extra chrome associated with "flash" styling. It is still a car for America's Main Streets.

EDITOR'S NOTE: For the fifth successive month the three-time winner of the Indianapolis 500 gives you a tape-recorded advance showing of a new car.

For all Pontiac Division's style conservatism—incidentally something that can save an owner bucks on depreciation—they've made plenty of small mechanical changes. For instance, they've put a bumper pad near the timing chain to keep it from whipping as wear occurs. They've put a new carburetor on the six. The cooling system has been changed for faster warm-up. Compression stays comparatively low at 6.51-to-1. Pontiac isn't a car that won't thrive on regular gas.

I drove the new jobs last fall at the General Motors Proving Ground near Milford, Mich. It's unquestionably one of the most complete road-test places in the world. They have 25 miles of roads, including one "Belgian block" stretch so rough it could wreck anything that took it too fast. They have a fine "Loop" with separate speed lanes. In fact, the 1,225-acre setup is so big, that wildlife is actually a problem. Although the whole place is fenced in, deer



Smooth as silk at 139 feet per second. This was the six I tried on the high-speed lane of the Loop at GM's proving ground. She was indicating 95, which is pretty good for a 96-hp. low-compression engine with automatic drive. I guess I was a lot more comfortable than the photographers who were standing out in the raw weather to get this shot.

occasionally jump the fence and recently one animal bashed in a glistening sedan.

When I showed up, the Pontiac Motor Division had two tuned-up '51 mounts waiting for me in the garage. One was a six with Hydra-Matic, the other a straight eight with a manual shift. The eight looked slick, but I was more interested in the six, which kicks out 96 hp. at 3,400 engine revolutions. Here's the playback from a recording of my reactions:

The hold-open on this door is the best I've ever seen . . . it's positive in engagement . . . and quiet.

They tell me there are four speeds in the drive range . . . some Hydra-Matics have only three . . .

Firing up still seems to be a two-handed job . . . you turn the switch with your right hand and press the starter button with your left. Why don't more manufacturers follow Ford and put the two together on the left?

This car is nicely proportioned, though it isn't as wide as some of the others . . . at least you can reach the door handle on the opposite side without lying down flat. . . Let's see how this baby picks up. Light throttle now, and we shift into second gear at 6 miles an hour . . . there's third at about 12 miles an hour . . . fourth at about 30. You can delay these shifts with harder throttle.

I was disturbed by something, or a lack of something, that I hadn't quite figured out yet. At this point we rolled onto the Belgian block pavement. It was rough, no doubt about that.

They've done a job on these rear springs. I've driven another car over this same stretch . . . the rear springs kept wallowing until they thudded on the bumper blocks. There was the same load in the rear seat that there is in this Pontiac . . . but there are no hits here . . . we haven't touched a bumper block yet.

I don't like this visor . . . they've put an accessory visor on the front of this car like a bill on a cap . . . it gets in my way . . .

You don't get a sharp downshift as you decelerate . . .

All of a sudden, I had it. I knew what had been bothering me. It was the absence of the klunking, in shifting from one gear to another, that I had always associated with automatic mechanical-shift transmissions. The transition from one gear to another was so smooth that it was hardly discernible. I began to experiment. Try as I might, I couldn't regularly catch the shift into fourth gear.

They've made a ride, all right . . . you won't get a better ride than this . . . it's due to a low spring rate . . . I can't get over how this car keeps its feet on the ground on rough going . . . there's no hopping.

I don't like the position of the brake pedal. It's too close to the accelerator . . . on automatic jobs, they ought to put the pedal over where you can work it with either foot . . . the tires give a normal amount of squawk on tight turns . . . lower tire pressure and you get more squeal . . . that's the penalty you pay for a soft ride.

The seat arrangement is good. I like the steering . . . a pretty good-sized man could

If you crowded her on a fast turn, there was a bit more roll than I like to feel. But how can you expect to get sports-car cornering from a smooth-riding family sedan?

It was a pleasure to take turns without getting that high-pitched, rubbery squeal. The 7.10 by 15 tires that the Pontiac carries seem to keep these noises down to a minimum.

get under this wheel comfortably . . . the backup is smooth . . . there isn't that shudder you get with some of the torque-converter transmissions.

The steepest hill on the proving ground is a 27-percent grade. It's so tough I wanted to try this six on it. On the way I rounded some curves a little fast.

That's a bit too much roll. They could improve on that, considering tread and height, with better stabilizing. . .

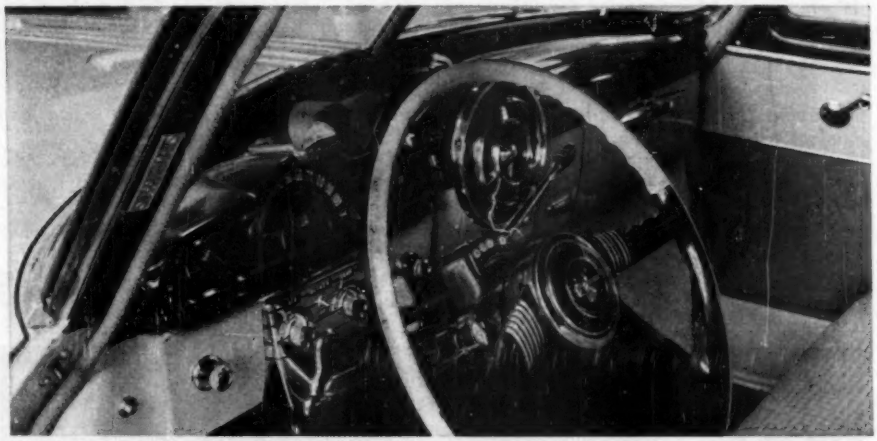
There were four people in the car. As I approached the foot of the hill, I had an impulse to get a run to make the top. Instead, I braked to a stop to make it really hard on the engine and transmission.

She starts easily enough . . . but what will she do with this load? We're gaining

This wasn't done with mirrors. It was hard for me to believe it even when I was standing there. It was on this 27-percent grade that I arrived at the conclusion that Hydra-Matic—at least in the version with four forward speeds—can deliver more torque in the medium-throttle positions than can the torque-converter types of automatic transmissions.

It takes a sharp eye to distinguish the '51 and the '50 Pontiacs. The grille has been simplified a bit. Slowness to make big style changes doesn't hurt at all at trade-in time.

The nameplate in back is to make sure the public identifies it as a Pontiac. These bumper guards are extras. In Hydra-Matic versions the six has a 3.636-to-1 rear-axle ratio.



The dash is mostly unchanged. One thing I did especially like was the heater and ventilator arrangement. On some new cars these controls are about as elaborate as a pipe-organ console.

speed . . . she's in Drive, too . . . gaining.

I called over my shoulder to Hubert Luckett, a POPULAR SCIENCE photographer in the back seat, that I'd bet him a buck the car would shift into second before we got to the top. He covered me.

Still gaining speed . . . it's a shame to take your money, Lucky . . . there's the shift . . . over the top.

Going down the hill, I was agreeably surprised to find that the Hydra-Matic gave me more engine braking power than a torque converter. Then we went onto the Loop to roll the six with the throttle floored. The speedometer needle stood at 95 m.p.h. as I eased off. Even allowing for instrument error, that's pretty good with 96 hp.

Next I took a brief turn in the eight. It felt like its 20 additional horsepower. What interested me more was its appointments. There were no bright surfaces to reflect sunlight in your eyes. The heating-ventilating system was so well-labeled you didn't have to be checked out to run it. The body was roomy but Pontiac hasn't wasted sheet metal in enclosing dead air that you carry around just for looks.

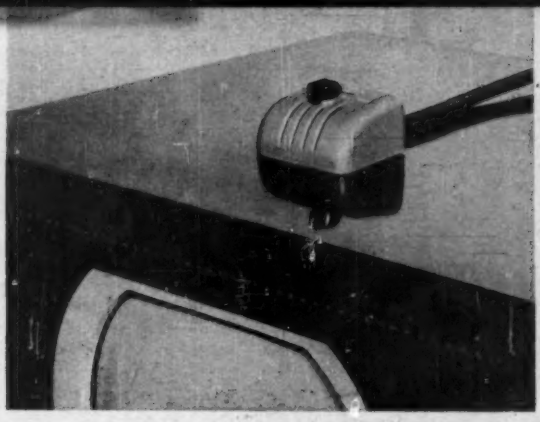
As I braked the eight to a stop, a mechanic in coveralls strolled over. "What do you think?" he asked.

"Wrap it up," I replied, "and I'll take it along with me." END

This Month's Shaw-ism

The total cost of inviting the other fellow to dim his lights is a slight pressure of toe on button.

Kilm Shaw



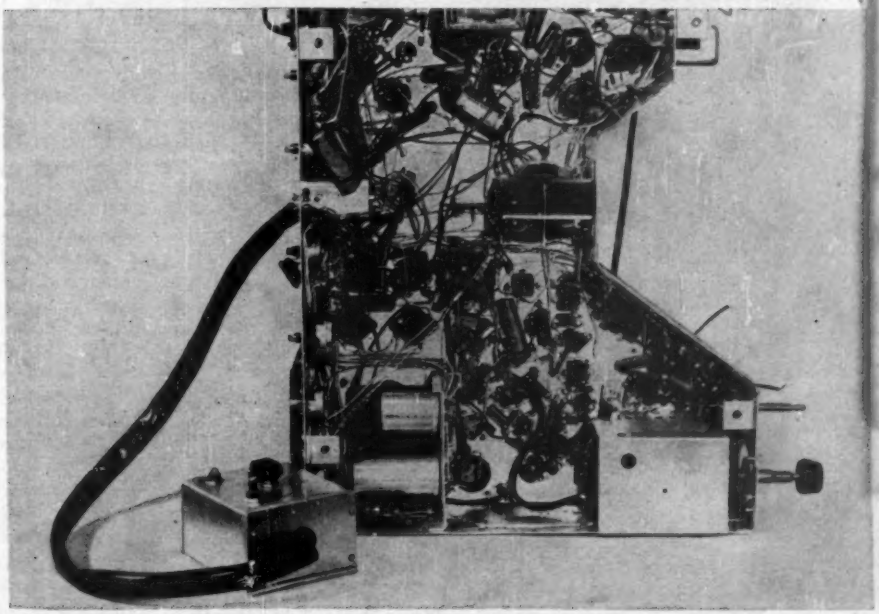
Color adapter, designed for use with a popular TV circuit, speeds up the electron beam so that it can trace out color pictures in black-and-white. Switch is on top. Fixed controls on back adjust focus and size.

$13 Adapter Catches TV Colorcasts

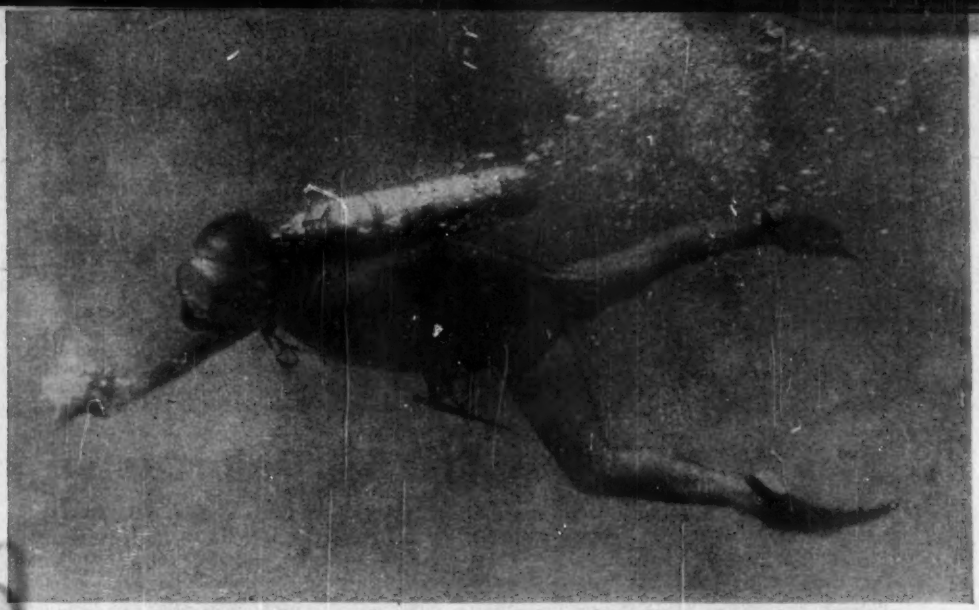
YOU may be able to make your television receiver "compatible" with CBS color for as little as $13. An adapter unit that you can install yourself has been put on the market by Television Equipment Corp., New York. It will alter any teleset of the RCA-630 type so that it can receive—but only in black and white—either color or black-and-white broadcasts. Receivers using the basic 630 circuit were introduced by RCA and duplicated by other makers.

The adapter makes switch-controlled changes in the circuits of the set. To install it you have to be able to identify several circuits, remove a couple of small parts, and solder in 15 leads from the compact, streamlined adapter box. Once it's installed and adjusted, you operate it by turning the switch from "color" to "black-and-white."

Even though adapters don't get pictures in color—for that a "converter," or synchronized, rotating color wheel is needed in addition—they do make good monochrome pictures out of color broadcasts. END

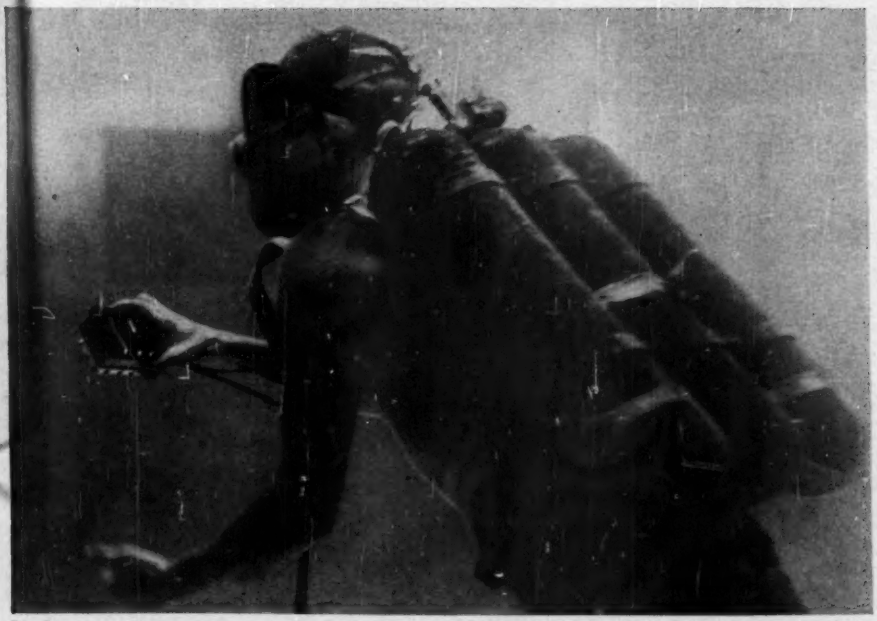


Pilot model of new adapter is shown wired to receiver. Instructions come with each unit.



Sample from movie taken with new underwater camera shows diver 85 feet beneath surface.

Undersea Camera Has Own



Underwater cameraman uses an exposure meter made waterproof with a metal-plastic case. Photo shows how Aqualung compressed-air breathing apparatus leaves diver's hands free.

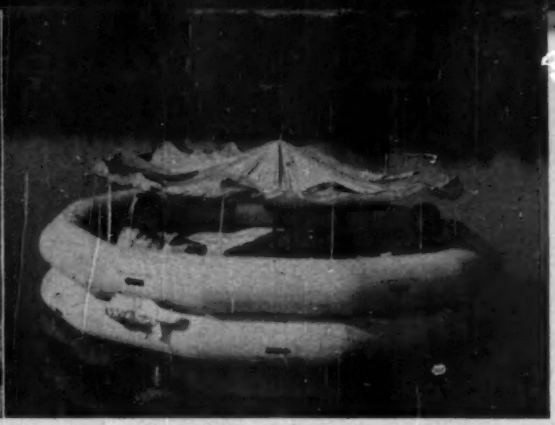
Diver-photoman uses fins to stabilize camera.

Air, Power

A MOVIE camera that swims like a fish is the U.S. Navy's latest wrinkle. The camera is a 35-mm., French-made Aquaflex, enclosed in a blimp-like metal case equipped with exterior controls for the lens diaphragm, focus, and start-stop switch. No lines to the surface are needed. A battery-powered electric motor drives the film.

The blimp has both vertical and horizontal fins. The horizontal fin acts as a planing surface, so that the diver can sight through the view finder, kick his flippered feet, and guide himself through the water by tilting and banking the camera. The device has its own cylinder of compressed air with a demand valve that maintains internal pressure always three pounds above the sea pressure, keeping out water. The outfit weighs 107 pounds but can be adjusted to have positive, negative, or neutral buoyancy. While operating the camera under water, the diver is equipped with an Aqualung, a French-made, self-contained, compressed-air diving unit. He also wears water goggles and swimming flippers. Both camera and diver could operate at depths up to 200 feet. The rig will be used to make training films for the Navy. END

Diver equipped for underwater photography, with new camera, compressed air supply, goggles, and swimming fins. It is the first self-contained undersea photo rig.



Life Raft Resembles Circus Tent

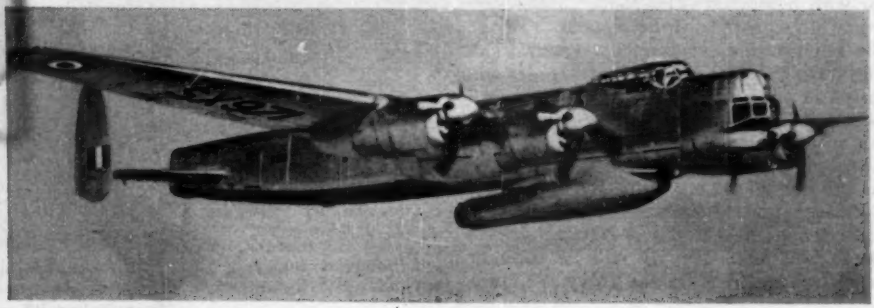
ONE man (left above) can lug a new Air Force life raft and all survival accessories to accommodate 20 men of a plane downed at sea. When thrown out of a ditched aircraft, the pull of a lanyard attached to a compressed-air tank inflates two rubberized nylon inflation tubes, resembling huge truck tires. A floor section is between the tubes, so it doesn't matter which side is launched up. The protective canopy, shown erected at right, is dyed a high-visibility red, has a radar reflector, and a drain to catch rain water for drinking.

Chain Saw Is Hydraulically Powered

THE chain saw at right is spun by a hydraulic motor, which gets its power from a pump on the tractor. Engineers at the Von Ruden Manufacturing Co., of Claremont, Minn., who perfected it, say the system is light in weight and easily controlled. Long hoses permit operators to fell trees or cut logs from virtually any position. The pump unit is hooked to the power take-off of a tractor or stationary engine. A small control lever allows starting and stopping saw without throttling the power source.

Prop Plane Aids Jet Research

THE Derwent jet engine fitted to the bomb bay of the British Lincoln bomber below leaves the main job of propulsion to the plane's four propellers. Its function is to record for automatic observers the characteristics of after-burning, the combustion in a jet's tailpipe that is used to increase engine thrust. To protect the plane's underside from the jet's hot exhaust gases, the bottom of the fuselage is covered with stainless steel.



Signal that a new phone is on the way—Charlie Thomas, installer for the N. Y. Telephone Co., connects wire that goes to the house to one (called a "pair") that goes to the exchange.

How Your Telephone Man Works

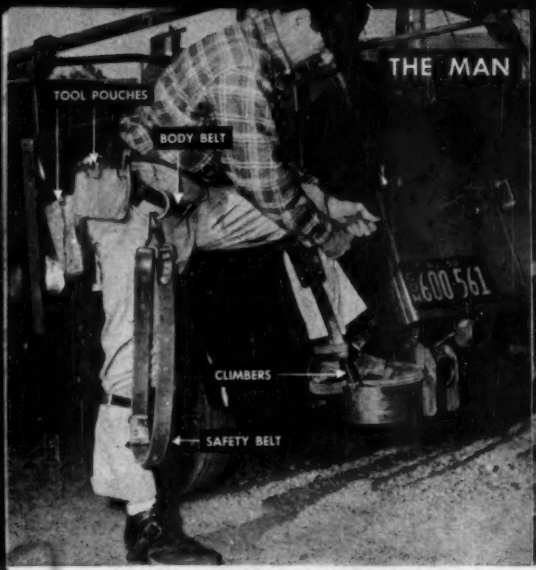
PS PHOTOS BY W. W. MORRIS

CHARLIE THOMAS climbs a pole like the one in the picture above a dozen times a day—just trying to catch up with the American demand for more and more telephones. Of the 8,000 new ones that join the Bell System every day, Charlie and his partner usually install four.

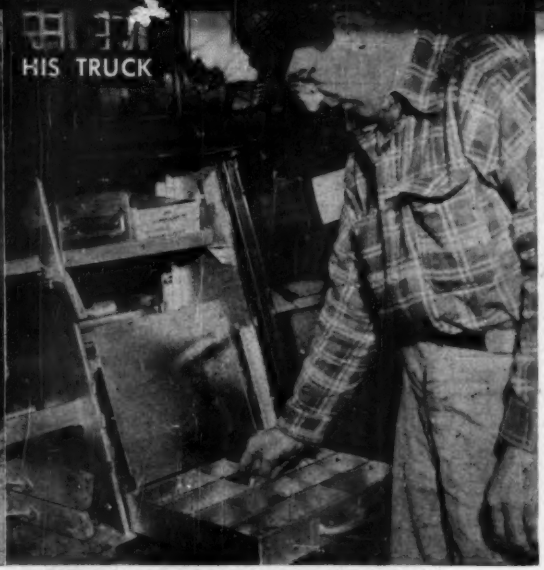
Pole-climbing is only part of the job. Charlie must also be a carpenter, an electrician, and something of an interior decorator. Neat, inconspicuous installations are what the customers expect. So Charlie and his partner, Joe Fennell, a telephone man for more than 25 years, must line up outside wires carefully, conceal inside wires in walls, floors, air ducts, or closets.

New houses, like the one Charlie is working on in this installation, pose special problems. Slab floors and insulation-packed walls offer no hiding place for wires, composition siding doesn't hold screws well and cracks if treated improperly, and even the attic—intended for future rooms—cannot be cluttered with wires or boxes. To see what it takes in equipment and skill for a neat installation despite these obstacles, turn the page.—*Martin Mann.*

THE MAN | HIS TRUCK



What the well dressed telephone man wears. Charlie straps on his climbers before starting his pole work. The safety belt hangs from loops on his body belt, which also supports tools and pouches for hardware and supplies. Notice ankle-high shoes, a necessity for pole-climbing.



Familiar dark-green truck has racks for ladders and a body designed with compartmented drawers and shelves for all kinds of supplies. Truck normally carries equipment and materials for many types of jobs. Photo below shows only things needed for this particular installation.

HIS TOOLS AND MATERIALS

HOW HE DOES IT

1 The job of installing a telephone starts at the house, no connection being made to the pole wires until the lightning arrester is in place. Above, Charlie Thomas attaches the corner house bracket that will hold the "drop" wire running from the house to the nearest pole.

2 The corner bracket holds the drop wire through a specially designed copper clamp, so that there is no strain on the wire loop around the bracket. The big loop allows for expansion and contraction as temperature changes. New neoprene-coated wire lasts longer, resists icing.

3 To locate stud, Charlie measures from edge of window. He'll screw in two insulated eyes so that wire makes gradual turn to run down side of house. Installers avoid sharp turns, which may wear on wire. Eyes must be screwed into stud, for this siding won't hold them.

4 Lightning arrester is grounded to outside water faucet. Arrester consists of two closely spaced carbon blocks that short excessive voltages to ground. Ground connection is also needed so that this telephone can be rung without disturbing others on · ·

6 While Charlie reaches under attic floor boards to locate the right spot, partner Joe Fennell works the drill. He expected to make hole in studding space between rooms—and did. Wire is fished along eaves between floor joists, then down between wall studs to baseboard.

5 With lightning protection in, actual connection to outside cable can be made. In this case—the first party on a new four-party line—wire has to be strung quarter of a mile down road to nearest terminal (shown on p. 117). When this is done, work inside house can begin.

7 Another wire comes down through closet and out near ceiling to bell box, which is hidden in out-of-the-way hall corner. Above, Charlie identifies wires by listening to characteristic clicks before making final connections to box. He will also check by calling operator.

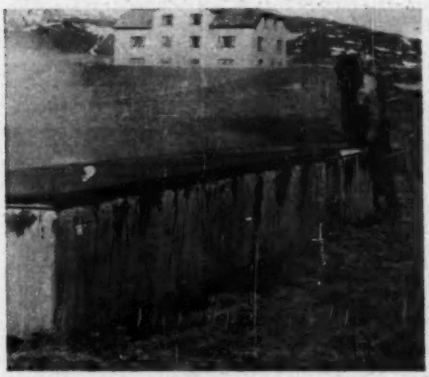
8 This house has wall jacks with plug-in type of telephone that can be moved around, used wherever a jack is available. There are two jacks, one in dinette and one in bedroom (above). Notice that only a few inches of wire show on bedroom wall, rest being concealed inside wall.

9 The telephone man makes the first call, asking the operator to call him back. In this way he makes sure that number is correct and bell rings properly. He prints number card with stamping device that is part of his kit and snaps it into place on the faceplate of the telephone.

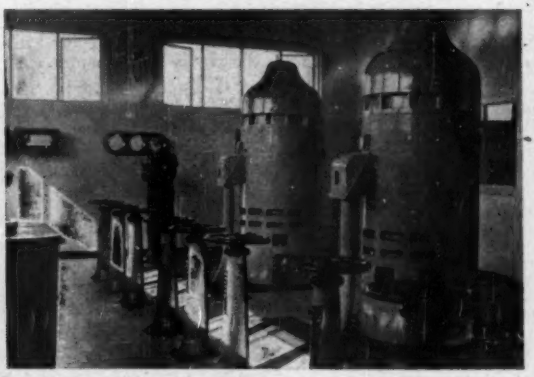
10 The job is finished and Charlie can clean up, pack his tools, and leave. The average installation takes about two hours, so that Charlie and Joe can usually complete four jobs in a working day. Notice the neat appearance of the wiring on the outside of the house.

Nature's Hot Water Piped to Iceland's Capital

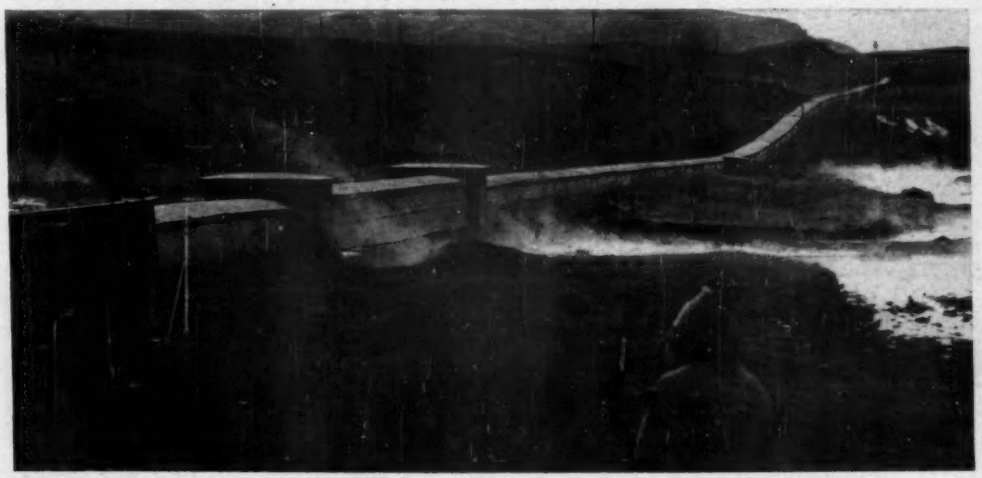
HARNESSING natural hot water that bubbles from the ground promises to turn chilly Iceland into an Arctic paradise. A unique central heating system, started in 1930 and recently completed, taps only a few of the hundreds of hot springs that dot the island. Yet the scalding flow, pumped overland, now provides the capital, Reykjavik, with 85 percent of its hot water. Users pay by meter. Plans are also under way for using the natural steam jets for the production of electric power.



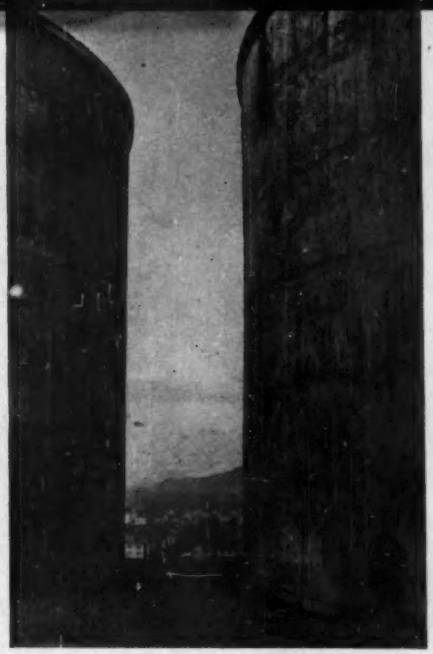
1 Hot springs have been used by the women of Iceland for washing for hundreds of years. Now at Reykir there are 43 wells like the one above, some as deep as 2,500 feet.



2 At main pumping station, the water—almost entirely free of objectionable minerals—is filtered, then pumped through twin 14-inch insulated pipes to Reykjavik.



3 Concrete conduits cross a mist-laden field in which hundreds of small geysers shoot up from subterranean volcanic pockets. Pipelines carry 81 gallons of water per second.

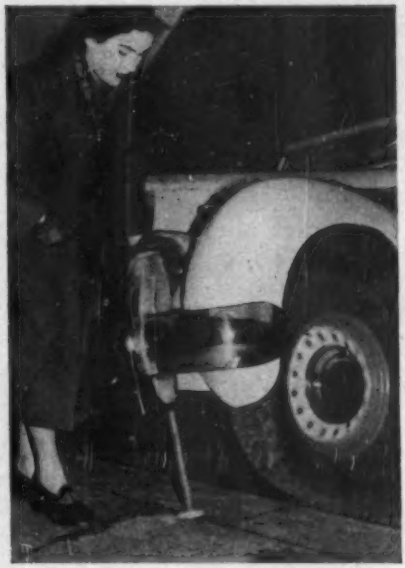


4 **Seven circular concrete tanks** store hot water on a hill overlooking the capital. Almost boiling at the springs, the water loses only a few degrees on its 10-mile journey.

5 **Flowers and vegetables** flourish in water-warmed greenhouses. Experiments have been so successful that even bananas have been grown less than 200 miles below the Arctic Circle.

Jack-in-Bumper Raises Car Wheel

DEVELOPED by a German inventor, a new wheel-raising method consists of four separate jacks built into the car's bumper guards. Each jack is operated by turning a handcrank that extends a rod downward against the ground, as shown below. If necessary, all four wheels can be lifted off the ground at the same time.

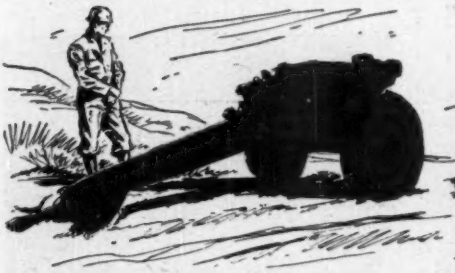


Spotlight Plugs into Lighter Unit

THE hand spotlight below plugs into a car's cigarette lighter, and can pick out a signpost at more than 1,000 feet. Made by the Arrow Safety Device Co., Mount Holly, N. J., the unit is compact enough to store in the glove compartment. It has an extension cord (inset) long enough so it can be used as a trouble light.

How to Tell the Guns

A 105-mm. howitzer crew somewhere in Korea prepares to lob one out in front of the infantry.



75-mm. pack howitzer is a deadly little peashooter that tosses a 14½ lb. shell more than 5½ miles. It's used by airborne units, was originally designed for fighting in mountains.

Army has more 105-mm. howitzers than any other cannon. It fires a 33-lb. shell at ranges up to 7 miles, can be towed up to 35 m.p.h. on good roads. Basic weapon of infantry division.

from the Howitzers

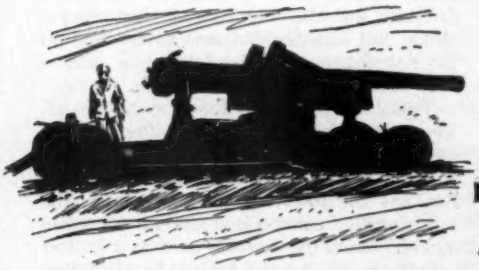
Mass destruction on wheels, the field artillery still rolls along, the big noise behind and ahead of the infantry.

By John F. Loosbrock

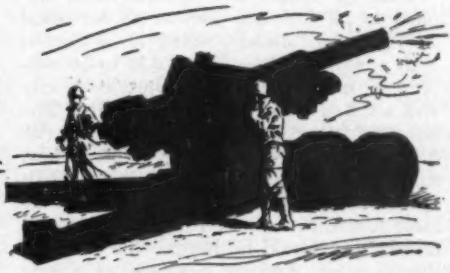
NO WAR correspondent in his right mind spends much time with the artillery. The noise boys work in the dirty end of the death factory, in a bang-clang business which hits the headlines only when it suddenly becomes the front lines. And it draws enemy fire like flies to a dead horse. It's not a comfortable spot even for a deaf man, what with the stench of smoke and sting of burning powder grains.

So you don't read much in the papers about the artillery. But you can bet your combat boots it was there, or you would have read much worse news about the infantry, the tanks, and the planes. The field artillery is always in there banging, brother, and it makes news only when it isn't.

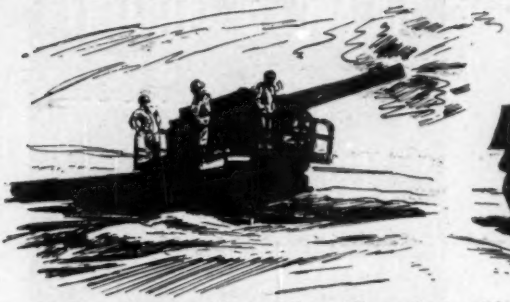
The boom-boom business is closer to an efficiency expert's dream than any other kind of shooting-to-kill. It's a complicated combination of muscle and mechanics, with a little chemistry thrown in. Every shell must be muscled from ammo dump to gun —and every round let off with due consid-



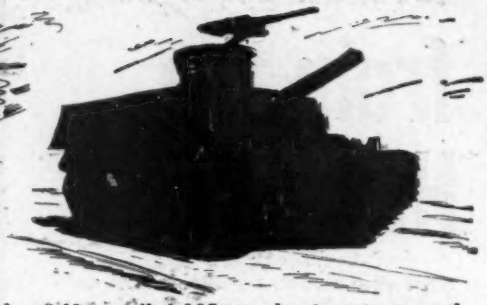
Famous "Long Tom" of World War II is the 155-mm. gun. It's shown here in traveling position for towing behind truck or tractor. It can drop a 96-lb. shell on a target 16 miles away.



The 8-inch howitzer is probably most accurate artillery piece the Army owns. It can drop a 200-lb. shell in your hip pocket from more than 10 miles away, and do it every two minutes.



Heaviest Army artillery shell, 360 lb., is fired by the 240-mm. howitzer. Like most big jobs, it breaks into two sections for towing. Sketch shows cannon and crew at moment of firing.



Self-propelled 105-mm. howitzer is mounted on a full-tracked motor carriage. It's used primarily in armored divisions, although eventually Army hopes SPs will replace all towed cannon.

eration for different kinds of targets, range, weather, and even powder temperature. That's why every battery includes an ordinary thermometer in its complicated linkage of steel, gunpowder, mathematics—and strong backs.

Artillery weapons themselves don't seem to have changed much. That's because, like the turret lathes, millers, presses, and other weapons of industry, they have been developed over years and even centuries. They are the machine tools of mass destruction, and like all machine tools, they've absorbed, in their screwturns of constant improvement, the advances of hydraulics, chemistry, electronics, and mathematics.

Guns vs. Howitzers

Actually, the term artillery takes in a lot of ground—mortars, rocket launchers, recoilless cannon, and antiaircraft pieces. But field artillery as such, and that's what we're talking about, comes in two distinct varieties—guns and howitzers.

Gun, of course, is a generic term applied to all firearms. But in its restricted and technical artillery sense, it's a cannon with a relatively long barrel (30 to 50 calibers* or more), with a high muzzle velocity and a flat trajectory, or angle of fire. The howitzer barrel is comparatively short (20 to 30 calibers). Its muzzle velocity is low, trajectory is high. It can lob shells over hills that would block targets from a gun. By the same token, the *gun* can reach out and hit targets that would be beyond the range of the howitzer. And the gun's higher muzzle velocity lets it damage targets that the howitzer couldn't hurt if it could reach.

That's because of the gun's longer barrel. A gun of a given size and using the same powder charge will throw a shell harder than a howitzer. An Army Ordnance expert explains it this way, "You can get more velocity in two ways. Kick the shell harder or kick it longer. With a long barrel you kick it longer."

Artillery bore sizes are reckoned, with one exception, in millimeters. They range from the 75-mm. pack howitzers issued to airborne troops to the mighty 240-mm. gun. In between are the 105-mm. howitzers, the 155-mm. and 8-inch in both guns and howitzers, and the 240-mm. howitzer. Figure roughly 25 millimeters to the inch for an idea of size.

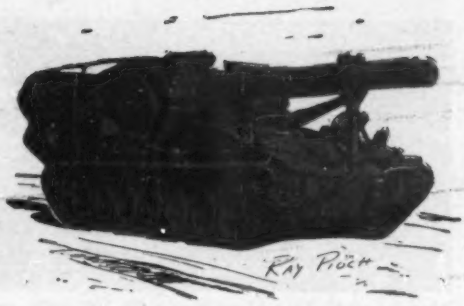
More about sizes later. Now let's talk about another artillery classification. A cannon can be towed by a truck or tractor, or self-propelled on a tank-like mount.

At first glance the self-propelled (SP) jobs would seem to be superior. Armored divisions use them to support fast-moving tanks. But infantry divisions have relied on the towed cannon and a lot can be said in their favor.

True, the SPs have the edge in speed. They can begin firing in a matter of minutes after they clank into position. The bigger towed guns take hours to emplace. But, say the towed cannon advocates, the self-propelled cannon is chained to its prime mover. Lose the vehicle and you've lost your cannon. It can't be manhandled into position if necessary. And a tracked mount is more complicated mechanically than a truck—plus the fact that a separate truck can

* *Caliber, in artillery, applies not only to the diameter of the bore, as in rifle and pistols, but also describes the ratio of barrel length to bore diameter. Thus a 50-caliber cannon has a barrel whose length is 50 times the diameter of the bore.*

Mobility of self-propelled 155-mm. gun coupled with its high muzzle velocity, 2,800 feet per second, makes it an excellent direct-fire weapon against tanks and fortified positions.



Big advantage of self-propelled jobs is speed. Even this giant 240-mm. howitzer can begin firing within minutes after clanking into position. A towed cannon often takes hours to emplace.

haul ammo or chow while its gun is firing.

Nevertheless, after a careful study, the official Army line calls for eventually self-propelling all artillery. But don't look for it to happen soon. Converting to tracked SPs runs smack dab into the tank procurement program which now enjoys top priority.

Artillery ammunition varies in type according to the size of the weapon. The small stuff, 75s and 105s, fire what is called semi-fixed ammo. (A rifle fires a fixed round. That is, the cartridge case and bullet are permanently fastened together until fired.) In a semi-fixed round, the powder is contained in a metal case separate from the projectile. That's so you can vary the charge according to the range. The powder comes in cloth bags, with the basic charge, or "charge one," doughnut-shaped to fit around the primer in the base of the shell case. The remaining charges, up to seven, vary in size, look like beanbags. Firing tables accompanying the ammo tell what charge to use for a given range. You detach the excess charges, if any, and fit the case and projectile together for loading.

Bigger cannon, from the 155 on up, both guns and howitzers, fire separate-loading ammo. The projectile is loaded separately, followed by the powder in cylindrical cloth bags. There's no metal shell case.

Projectiles, too, vary in type according to what you're shooting at.

High explosive (HE). The most common. Its comparatively thin walls of forged steel are filled with TNT. They splinter into killing fragments when it explodes.

High explosive antitank (HEAT). The famous shaped-charge shell, used against armor and reinforced concrete (PS, Oct., '50, p. 98).

Chemical shells. Contain toxic or irritant gases, or smoke-producing phosphorus.

Illuminating shells. Contain a parachute flare ejected in mid-air by a time fuze. The parachute slows the flare's fall enough to light up a suspected battlefield area.

Armor-piercing shells. Primarily fired by tank and antitank guns. Field artillery sometimes uses them for fire against tanks.

Artillery fuzes, too, vary according to what you're aiming at. In general, their classifications are:

Impact: Either point-detonating, to go off the moment it hits, or delay, to go off at a predetermined time after impact. The latter lets the shell penetrate a bit before it explodes to get at dug-in troops, pillboxes, and the like.

Time: Can be set to explode at a predetermined time after firing. The idea is to get aerial bursts over protected troops.

Proximity (VT): A sort of foolproof time fuze. In its nose is a tiny radio set, from which radio waves are constantly emitted. When these hit a object and bounce back to the fuze, the shell explodes.

Artillery is distributed through the Army according to the job it has to do. Workhorse of the artillery is the 105-mm. howitzer. It's the basic artillery arm of the infantry division, distributed in three battalions of three six-gun batteries.

Each infantry division also has a battalion of 155-mm. howitzers. It usually helps support the regiment having toughest going at the moment. Really big stuff, 155-mm. guns, 8-inch guns and howitzers, and 240-mm. howitzers are controlled at corps or army

Workhorse of the field artillery is the 105-mm. howitzer, shown here being loaded and fired. Semi-fixed ammo (left) includes projectile, shell case, and seven charges of powder. Amount of powder used is determined by range. Excess charges are detached (center) and projectile fitted into case for loading. Breechblock (right) is horizontal, sliding-wedge type.

level. They do artillery's other big job—firing at the enemy's artillery, called counter-battery fire.

For counter-battery fire, of course, the ancient rabbit-stew recipe holds true. First you have to find your target. Artillery does this in a number of ingenious ways—by the sound of the cannon, by the flash of its fire, and by using radar. Sound and flash equipment works from two or more known points on the ground and picks up the location of enemy batteries by triangulation.

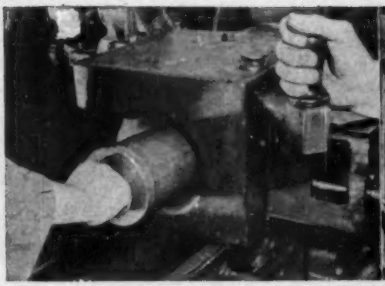
Radar is a little trickier, and to date is effective only on slow-flying mortar shells. The shell flight is tracked and traced backward through its trajectory to its source. Similar equipment to locate faster-moving shells has high research priority.

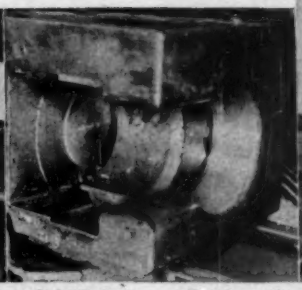
What's coming up in the artillery field is largely a matter for speculation. One high-priority project is the lightening of field pieces for airborne use. This involves the substitution of light metals like magnesium and titanium for steel. The airborne people would also like a heavier cannon than the 75-mm. pack job—maybe a 105 or larger that would fold for dropping.

Self-propelled cannon will be improved. A drawback thus far has been the limited angle of elevation, due to the tube hitting the floor of the carriage during recoil. One solution would be improvement of the variable recoil devices now used on some weapons. These shorten the recoil distance as the angle of elevation increases. Another big step would be a turret mount, like a tank, allowing 360 degrees traverse, firing in all directions without moving the carriage.

But the biggest artillery boom of all is still unharnessed. That would be the wedding of the atomic bomb with the artillery shell. Veiled hints have been dropped that this is not too far off. And when and if that day comes, you'll see a more thorough revision of strategy and tactics than A-bomb makers ever dreamed of. END

Separate-loading ammunition is fired in big cannon. Powder is loaded separately—there's no shell case—in cloth bags (left), in increments according to range. Projectile for 8-inch gun (center) weighs 240 lb., is carried on loading tray by four men. Tray fits onto end of loading ramp. Heavy shell is pushed up ramp with rammer, shoved into chamber (right).





Cannoneer slams home shell with balled fist to avoid pinched fingers (left). Breechblock (center) is beveled on forward edge. Bevel forces round into chamber, wedging action seals off tube. One pull on cord, called lanyard, cocks and fires the piece. First part of pull compresses firing spring, rest of movement disengages sear, forces firing pin against primer.

If you figure roughly 25 millimeters to the inch, you'll get an idea of the sizes of these shells.

Powder charge, weighing 106 lb. for maximum range, is loaded directly into chamber. It can kick the big projectile more than 20 miles. Firing pin and primer are contained in interrupted-screw type breechblock, which is shown below being shoved into place (right). Long-range guns like this one are used against enemy artillery and fortifications. PS PHOTOS BY W. W. MORRIS

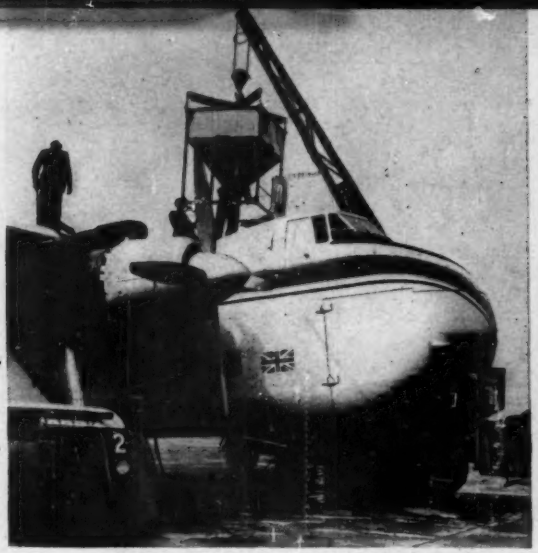
Fertilizer Dropped from the Sky

FORTY tons of lime, phosphate, and nitrochalk recently fell from the sky upon the countryside in a mountainous district of Wales during a two-day British demonstration of large-scale aerial fertilizing. Especially fitted for the purpose, a big Bristol plane showed in eight flights how vast areas of inaccessible and neglected land could be transformed into fertile farm land.

Light planes have long been used effectively for crop dusting with chemicals to control insect pests. Aerial fertilizing has also been tried on a small scale. For the past two years, the New Zealand Air Force has been making experimental drops of pelleted superphosphate fertilizer from a one-ton hopper slung beneath the fuselage of a Grumman Avenger. Success of these trials led to the new large-scale method.

A Bristol Type-170 Freighter was chosen for its large capacity, low operating cost, and ability to operate from grass fields or short improvised runways. It was fitted with a six-ton hopper, operated by one man in the fuselage. Simple mechanical controls avoided problems of servicing hydraulic or electric systems in remote areas. Accompanying photos show the resulting fertilizer plane in action.

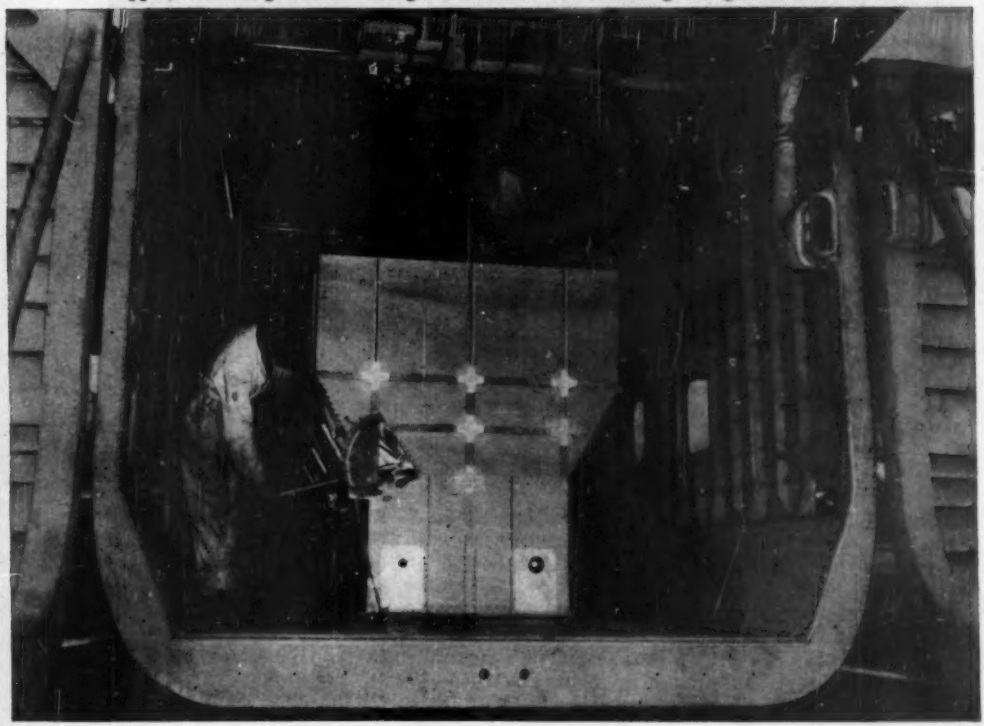
Ground party watches plane scatter tons of fertilizer. Second man from left has walkie-talkie set and is directing operation by radio instructions to pilot.



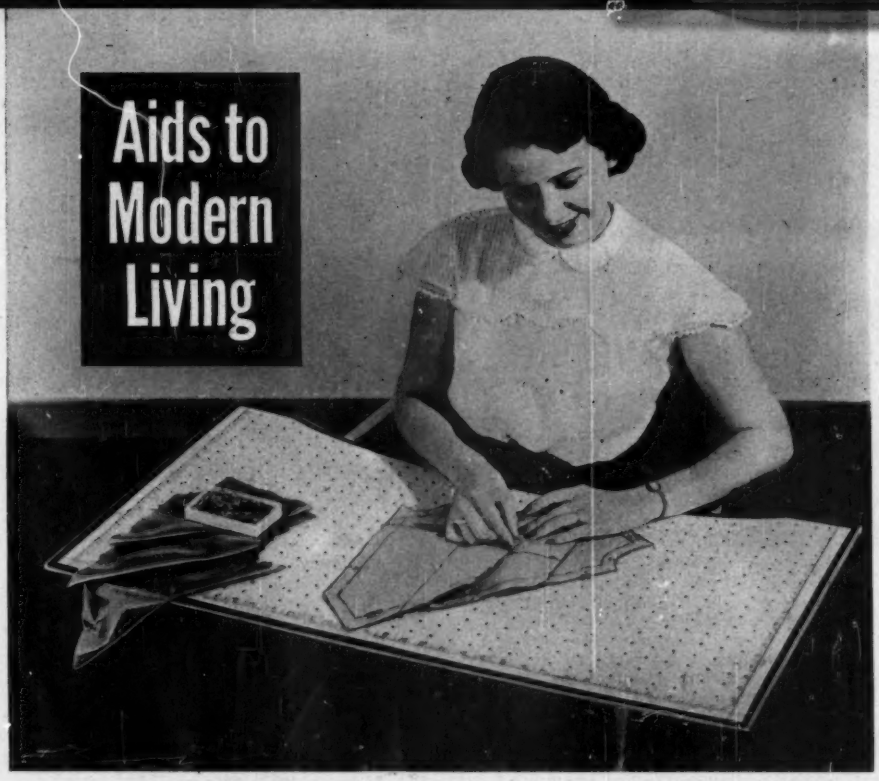
Before flight, big Bristol freighter plane is loaded with fertilizer. Crane supports funnel-like device from which material feeds by gravity through tube into hopper within the plane.

After flight, a Welsh farmer examines pellets of lime thickly strewn from plane over "target" area. In other successful trials, plane scattered phosphate and nitro-chalk fertilizers.

Fertilizer hopper in big plane has six-ton capacity. Man in picture is holding one of release levers that open shutters, in apertures beneath hopper, to discharge contents in flight. Different kinds of fertilizer may be placed in three compartments of hopper, and released simultaneously to give any desired mixture of chemicals for fertilizing the ground below.



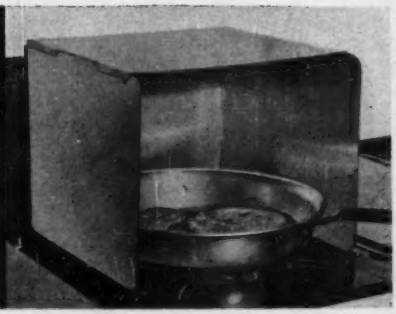
Aids to Modern Living



Cutting Board Fits Lap. Sewing and cutting jobs are easily handled at lap level with this stiff board. Constructed so that fabric pieces can be pinned to its surface, it has inch markings in a grid pattern for aligning materials. Measuring 20 by 37 inches, the board is priced at $1.29 by John Dritz & Sons, New York City.

TV Seat Is Inflatable. When Junior sits on this one-pound plastic-balloon hassock to watch television, suction causes it to grab the floor or carpet. When deflated, the stool can be folded for storage. Plastictronics, Inc., New York City, sells it for $2.50.

Liquid Unsticks Adhesive. Squeezed from a flexible plastic bottle, a new liquid, called Quit, loosens adhesive bandages so they can be removed without pulling a patient's skin. Patron Chemical, Los Angeles, makes it.

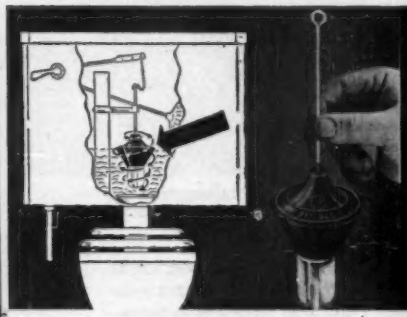


Shield Catches Grease. Propped around a frying pan, the spatter shield above has a top for keeping bacon warm while eggs are cooking. It unfolds for use as a cookie-baking sheet. Mrs. Letha O. W. Cordrey, San Diego, Calif., sells it for $1.50.

Desk Lamp Is Also Wall Light. This brass lamp has a pendulum-like shaft that pivots so it can stand on a desk or hang by its base from the wall. Imported from Italy, it is one of a collection of Italian lamps sold by Lightolier, Inc., New York City, for $19.50 and up.

Stationary Iron Clamps to Board. Resembling a long-necked bird, this electric iron presses ruffles, puffed sleeves, and other hard-to-reach places. Materials are drawn over its head and beak. Frank Meier, Inc., Menlo Park, Calif., prices it at $19.95.

Vacuumer Cleans Hair. Plugged into an AC outlet, this hair cleaner loosens dirt and dandruff, then sucks them into a disposable filter. It has a rubber brush with vibrating fingers that massage the scalp. H. C. Paulk, Inc., of Topeka, Kan., sells Hair Vac for about $15.

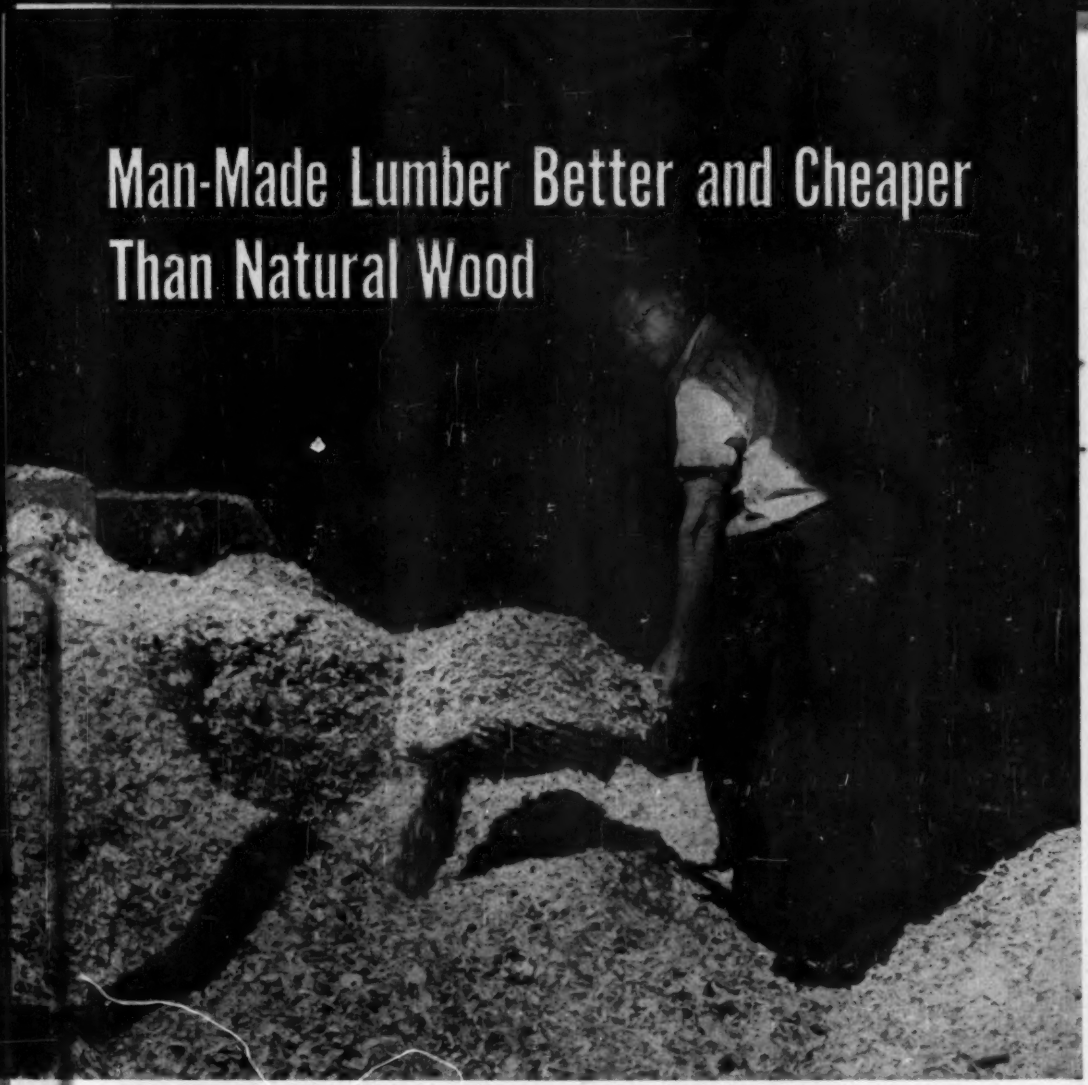


Ball Cuts Water Waste. This tank ball and rod is said to put an end to running toilets. Fins cause the ball to swirl down to the valve seat during flushing. This results in seating that stops noise, water waste. Chicago Specialty Mfg. Co., sells it for 75¢.

Tape Marks Hem. Dressmakers can mark a hem in a minute with the tape-dispensing Hemaliner above, says the Macton Machinery Co., Port Chester, N. Y. As a customer stands on turntable, a wheel presses tape on skirt.

Crank Replaces Key. This crank-operated can opener winds the metal strip smoothly off a vacuum container. Just put the slotted end of the crank over the band tab and turn. Jifi Sales Co., Milwaukie, Ore., sells the re-usable, steel opener for 30¢.

Man-Made Lumber Better and Cheaper Than Natural Wood



Chips of wood are forked into a spiral conveyer that leads to a grinder. Then the fine wood particles are blown into a big hopper over the mixing point. Softwoods are mostly used.

By Frank Rowsome, Jr.

PS PHOTOS BY HUBERT LUCKETT

A GOOD-SIZED New Hampshire factory is busy 24 hours a day at what seems, at first glance, like one of the world's silliest industrial operations: they grind up lumber into bits and remake it into lumber.

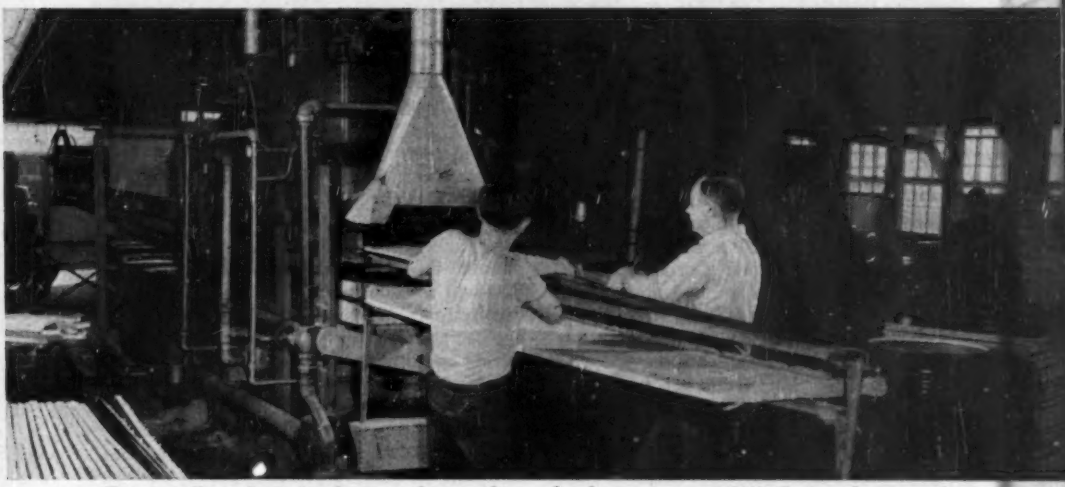
Far from being a boondoggle, it's an operation that may foreshadow major changes in several U. S. industries. Experts say that the process could some day make a sawmill plank about as quaint as a hand-wrought nail. It may reduce the amount that a new home will cost you, and it may substantially enlarge U. S. timber resources.

Synthetic lumber—which is ground-up wood bonded with a resin under heat and pressure—holds this glittering promise because of basic defects in natural lumber.

The best conventional methods of changing logs to lumber are spectacularly wasteful. It's estimated that less than 30 percent of the wood in the log reaches the con-

Sawdust-like mix of ground wood and resin powder pours into container as worker watches a scale balance. Mixer overhead continuously adds resin to wood in controlled proportions.

Paper makes a tray to carry the mix into the press. "Comb" in man's hand spreads it on paper while previous boards are cooking in press. This press makes two boards in each cycle.



Tongs pull synthetic lumber out of press after it has been squeezed at 200 lb. per square inch for three minutes at 325° F. Boards are run between paired bandsaws to trim off rough edges.

sumer as lumber. Even at that, a big part of this scant third is inferior grade. Moreover, the characteristics of natural lumber are mainly fixed—applications have to be governed by what nature built into the tree.

With man-made lumber, none of these limitations apply. Practically all the wood can be used, including logs that the boss sawyer at a sawmill would call hopelessly inferior. The product, too, is of uniform quality, with no loss from down-grading. Special characteristics that are needed—hardness, shear strength, moisture resistance, nail-holding power—*can be built in* at the mill. And because the process, compared to that of a sawmill, gives a far higher yield from cheaper raw material, synthetic lumber may even cost less.

The dream of turning wood fibers into a better board isn't in itself new; the immense waste between forest and consumer has long stirred men's imaginations. But until recently only the insulating and "hard" boards have made a place for themselves, and in

Synthetic lumber looks like this. Circular object is section of factory roller. Dark board is tile "underlayment"; light one is sheathing. Corrugated material in back is experimental.

both cases physical limitations and manufacturing costs have been restraints. (The principal difference between the older "felted" boards and the new ones lies in the use of thermosetting resins for bonding.)

European mills, spurred by comparatively meager timber resources, produced a successful resin-bonded board in 1947. Last year the U. S. Plywood Corporation announced plans to build a plant that would make a board of this type (PS, June '50, p. 205). Meanwhile, other U. S. firms, notably the Souhegan Mills, at Wilton, N. H., jumped into the market and are now turning out millions of board feet a year.

Souhegan's main product at present is Plaswood, a ⅜-inch board used as a base for linoleum or floor tile. It is about as hard as maple, almost as strong as plywood and much cheaper—and builders are using it at a rate that keeps the mill on three shifts. Raw material consists of the rough, irregular scraps that are trimmed off when sawmill slabs are squared up. Chewed up by a chipper and a grinder, the wood particles that result are almost entirely usable. (A small fraction that isn't fires boilers to heat the presses.) Depending on price, the mill could equally well use timber straight from the wood lot, or old sawmill dust.

The manufacturing process, as the photos at Souhegan Mills on the previous page show, is essentially simple, though it requires careful control of variables. Besides the linoleum "underlayment," other products in the works include core stock for furniture veneers, special pressed and extruded forms, and a new sheathing board for construction purposes.

Future products may not be restricted to flat, plywood-like boards. It may even be possible to manufacture structural members that will replace familiar two-by-threes and two-by-fours. Here the problem will be to get beam strength to match or excel natural wood, something that can't be done on conventional molding equipment. But with special presses to apply lateral as well as lengthwise pressure, structural beams almost as sturdy as metal ones may be a commonplace in coming years.

Meantime, it's the sheathing board now being made that has R. A. Caughey, Souhegan's research director, particularly excited. It makes a building far stronger, he points out, than conventional diagonal lumber sheathing. It resists nail-hole enlargement from wind stress far better than insulating or gypsum board. It allows siding or shingles to be nailed on at random without special nails. It makes a house more fire resistant, because the resin-bonded wood burns unwillingly. And all this, Caughey emphasizes, can be had from a waste-product board that cuts costs, saves labor, and lessens timber-lot depletion. END

Jet Engines Swing Down for Repairs

To SAVE precious repair time on the ground, Northrop now installs the jet engines on the Air Force's F-89 fighter planes on swing-out mountings. Maintenance men need only remove the cowling and pull the power units down and outward to a convenient waist-high position, (right). It's not even necessary to disconnect controls, electric wiring, or oil lines. When the repairs are finished, mechanics operate a built-in hydraulic pump that lifts the engine back up.

New Lincolns for '51 Look Longer and Live Longer

WITHOUT changing length, the Lincoln and Lincoln Cosmopolitan for 1951 have been made to look longer. This is achieved by extending the lines of the rear fenders. Both cars have slightly boosted horsepower—from 152 to 154. Closer bearing fits on crankshafts and con rods reduce engine noise. Alloy-iron blocks increase engine life.

Binoculars Give Wide View

SETTING a new style in binoculars, this rectangular-lens sport glass replaces the usual circular view with an oblong one (inset). Its wide field of vision, which conforms more nearly to that of the human eye, is said to make action on a ball field or theater stage easier to follow. The three-power glass, weighing about six ounces, is manufactured by Wide Vision Optics, Inc., of Chicago.

Moving Belt Speeds Grocery Checkout

SHOWN below in use at an Atlanta supermarket is a faster checkout counter developed by the U.S. Department of Agriculture. Built into the counter is a motor-driven belt on which the customer places her groceries. The checker rings up the price with the right hand and with the left hand places each item into the grocery bag standing in the open well. The register totals the bill and makes the correct change.

International News Photos cameraman gets set for ringside shot in opening moments of Louis-Charles fight at New York's Yankee Stadium. Land camera is fitted to back of Speed Graphic.

Quick-Print Camera Turns Pro

Once called a party camera, the print-in-a-minute Land is now paying its own way as a full-fledged professional.

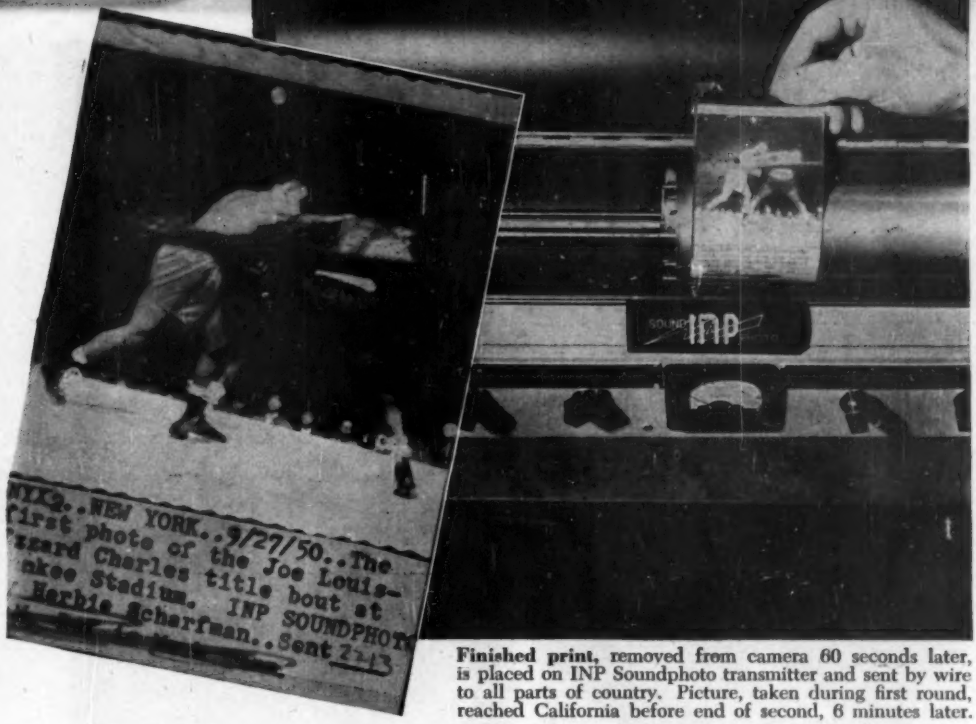
By Sheldon M. Gallager

A FEW months ago a New York news photographer pushed an odd-looking camera into a boxing ring and snapped an action picture of Joe Louis taking a poke at Ezzard Charles. A minute later, he peeled a finished print from the back of the camera itself, slapped it on a wirephoto transmitter, and sent it out to newspapers all over the country. Total time: about six minutes from camera to California.

The camera that made this possible was the self-developing Polaroid Land camera that uses a special chemical process to turn out a finished print 60 seconds after you snap the shutter (PS, May '47, p. 150; Feb. '49, p. 232). Considered a novelty when it first went on sale in 1949, it is now earning its keep in a variety of jobs where speed and certainty pay the bill. A few of these uses are shown on this and the following pages.

Adding to the camera's versatility is the recent introduction of black-and-white film. Producing clearer, sharper images than the original softer-toned sepia, it also lets you control contrast better by varying developing time. Where lighting is flat with few highlights and shadows, you can increase the normal time to heighten the contrast. On the other hand, pictures that are too harsh and contrasty can be softened by cutting the time.

The earlier film left a thin layer of spent developing reagent on the face of the print that collected dust while it was wet and caused cracking when it dried. Now this sticky layer is carried away on the neg-



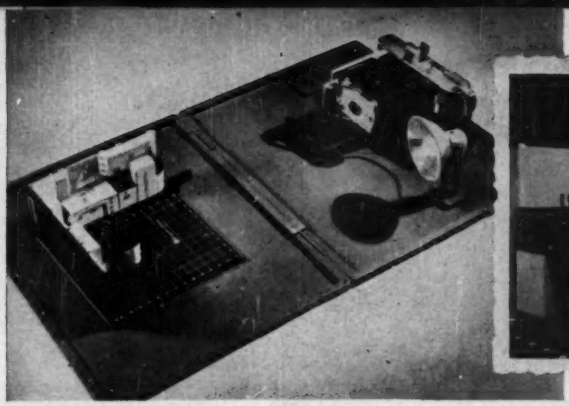
Finished print, removed from camera 60 seconds later, is placed on INP Soundphoto transmitter and sent by wire to all parts of country. Picture, taken during first round, reached California before end of second, 6 minutes later.

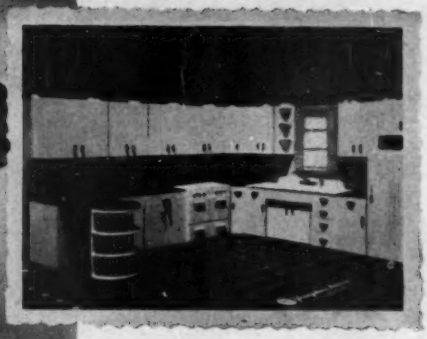
ative, leaving the print dry and flexible.

To simplify the camera's use, both shutter speed and lens opening are combined in a single, numbered control, providing eight settings from f/11 at 1/8 sec. to f/45 at 1/60 sec. For accuracy in determining exposure, you can get a special Polaroid-GE light meter calibrated in numbers corresponding to the camera settings. And if you flub a picture, you can tell right away and can thereby shoot it over at once.

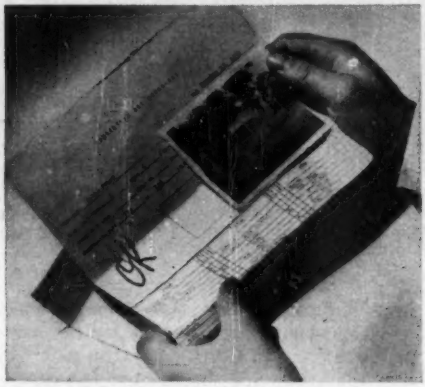
To meet growing demands for the camera, the Polaroid Corp. is already planning new versions, some simpler and less expensive than the present $89 model, others more elaborate with high-speed shutters and faster lenses. Now available are a set of filters and close-up lenses, each mounted in its own adapter ring to speed changing, and a tape measure that shows field size

Cartoonist Jimmy Hatlo uses Polaroid Land camera to record a model's pose for famous "They'll Do It Every Time" cartoon, eliminating painstaking sketches formerly required. At right is finished cartoon, reproduced through courtesy of King Features Syndicate and Jimmy Hatlo.



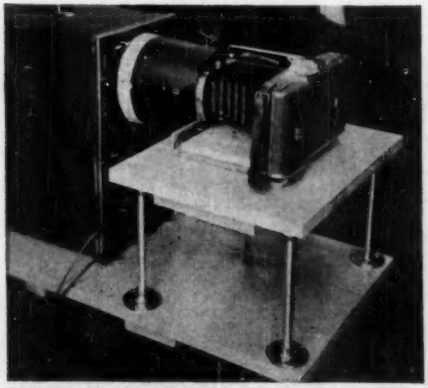


Model-kitchen setup, devised by Youngstown, lets home planners see exactly how their real kitchen will look—long before they buy. Model is first arranged to suit customer, then photographed by Land camera, and prints are given to prospective clients to take with them.



Bank appraisers use 60-second snapshots to help verify reports on mortgage applications. Real estate agents also use camera to provide house-hunting clients with on-the-spot pictures.

Freight shippers use camera to record condition of cargoes at receiving points to validate damage claims. In same way, camera is used by investigators to authenticate insurance claims.



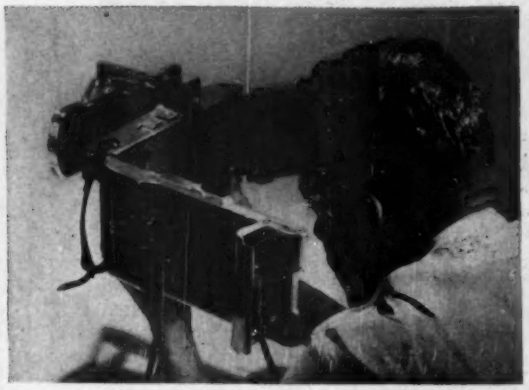
In laboratory setup, oscilloscope readings are recorded for quick analysis by Land camera placed in front of hooded tube. Mounted on microscope, camera makes photomicrographs.

British golf pro Henry Cotten uses camera in teaching student golfers. Pictures of students in action show immediately what they are doing wrong and help them to correct mistakes.

and correct focus for any camera distance.

On the battle front, the quick-print camera is certain to aid patrols photographing enemy installations. Aerial mapping crews may also use it to make sure their regular cameras have covered all the necessary area before returning home.

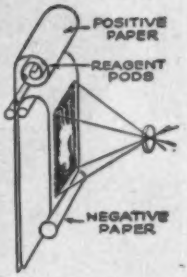
And in at least one instance, the versatile camera has already become a hero on the home front. Florida news photographer Pat Ford sneaked one into a Ku Klux Klan rally, caught one of its leaders with his hood down, and snapped his picture. The enraged Klansmen smashed his camera, but the picture, removed seconds earlier, was safely hidden inside his undershirt. END



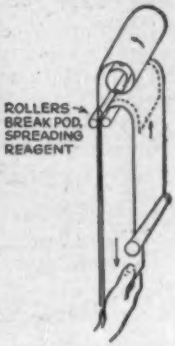
For critical focusing, image can be viewed directly on ground glass, inserted in back of camera before film is put in. A standard replacement glass for 3¼ by 4¼ plate camera will fit.

New black-and-white film permits control of contrast by varying developing time. Photos above have identical lighting, but one on right, developed longer, shows heightened contrast.

HOW LAND CAMERA WORKS



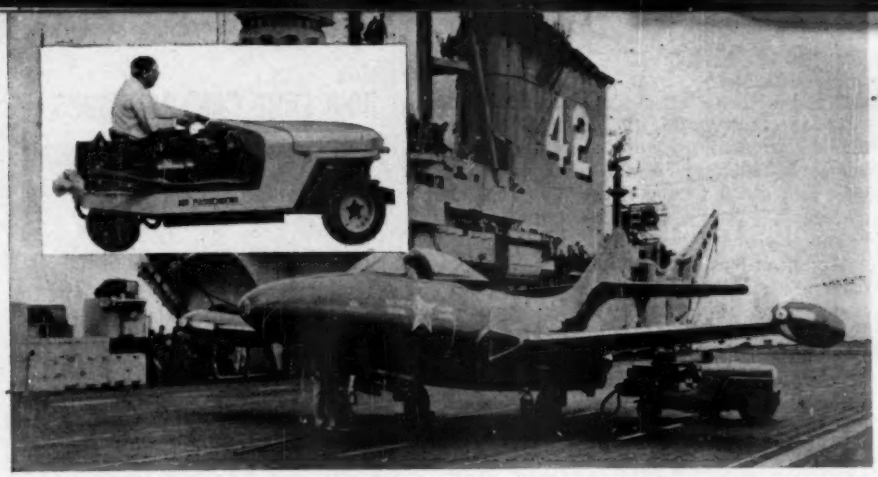
1 Special film has two rolls, one of positive paper and one of negative, connected to single leader. Attached to positive are eight pods, one for each picture, that hold jellied developing reagent. In the taking position, only negative is exposed to light.



2 After picture is taken, leader is pulled out through bottom of camera until it automatically stops. This advances both the rolls simultaneously, pulling negative around in contact with positive paper and forcing both through two rollers. Pressure of rollers breaks reagent pod, spreading developing chemicals evenly between two sheets.

SILVER NOT USED IN FORMING NEGATIVE IS DEPOSITED TO FORM POSITIVE PRINT

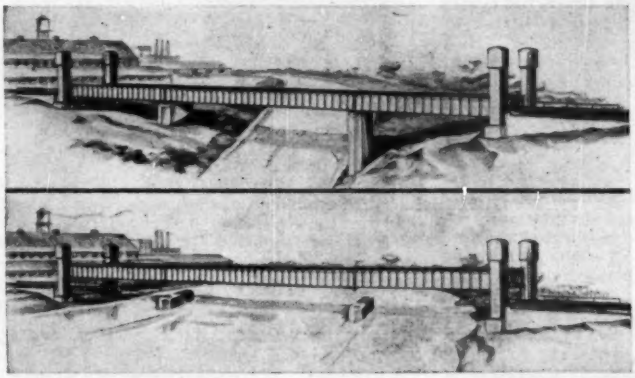
3 In one minute, reagent chemicals first develop negative image, then dissolve unused silver left on negative and deposit this on positive paper. Silver forms positive image, exact reverse of original negative. When image is complete, chemicals automatically stop action, and print becomes permanent. It is then peeled off negative and removed from back of camera.



Jeep Power Plant Starts Jets

THE three-wheeled Jeep seen maneuvering easily under the wing of a Grumman fighter at right above is a self-propelled electric power plant for starting the plane's jet engine. The low-slung, 1,750-pound vehicle (inset), developed by O. E. Szekely Associates, of Philadelphia, can scoot like a cat around the limited and often plane-cluttered flight deck of a carrier. It has front-wheel drive, and steers by a single rear wheel.

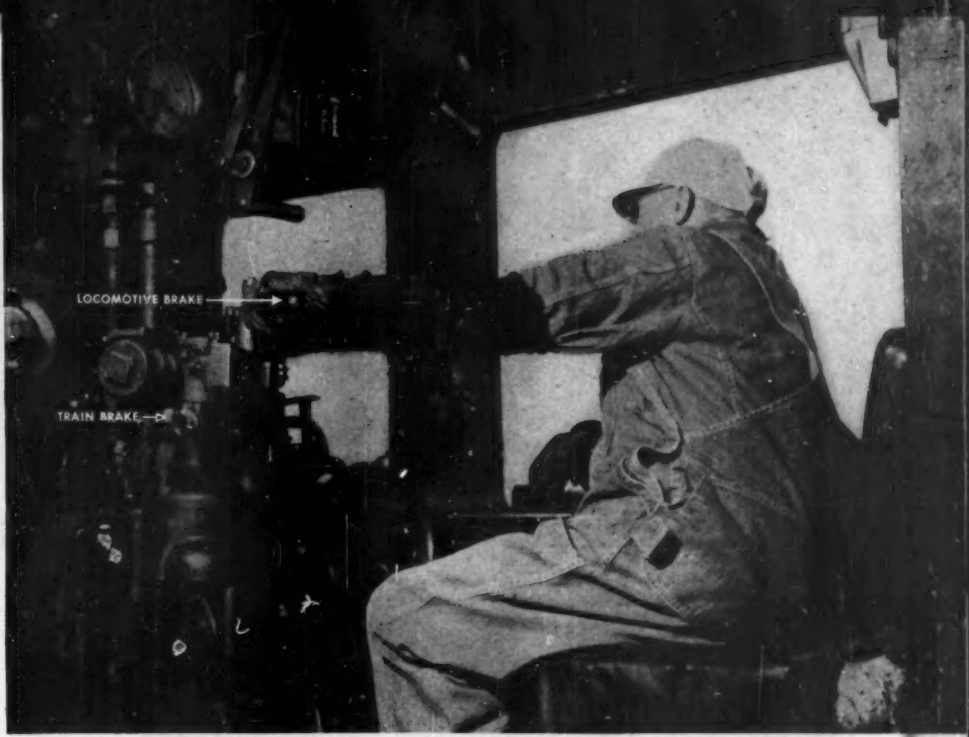
Bridge Raised by Its Own Bootstraps to Foil Floods



WHEN flash floods hit the Blue River near Kansas City, Mo., next time, a 232-foot continuous-span railroad bridge will be lifted off its concrete supports to clear the raging waters. Cable-winding drum hoists in the four corner posts will raise the 320-ton bridge three feet above high-water level in 30 minutes, as shown in drawings.

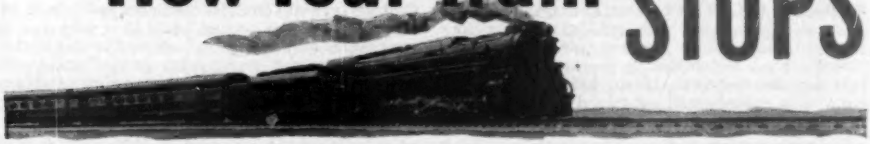
Automatic Breathing Device Guards Against Lung Injury

THE artificial respirator shown being demonstrated at right automatically prevents harmful lung pressures while reviving a victim of asphyxiation. A two-valve unit regulates intake of oxygen and stops it when the patient exhales. Called a Pneolator, it is made by the Mine Safety Appliances Co., Pittsburgh.



A move of the locomotive brake lever brings a New York Central iron horse to a smooth stop.

How Your Train STOPS



Combining giant strength with a delicate touch, air brakes can weigh loads, figure speeds, detect and halt skids.

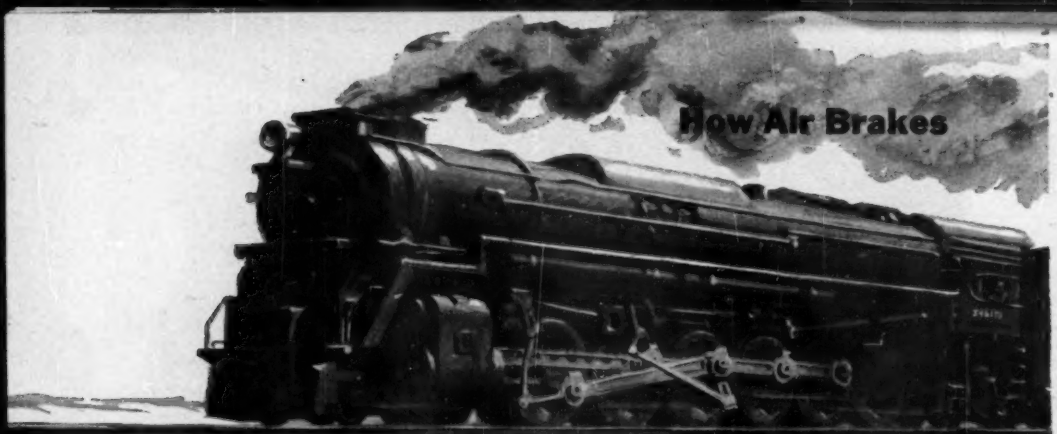
By Bill Reiche

DRAWINGS BY RAY PIOCH

WHEN your newspaper headline screams "77 Dead as Express Plows into Stalled Train," you can be pretty sure that it wasn't failure of the brakes to stop the train that did it. In 35 *billion* passenger miles on U. S. railroads in 1949, not one passenger was killed as a result of defective brakes.

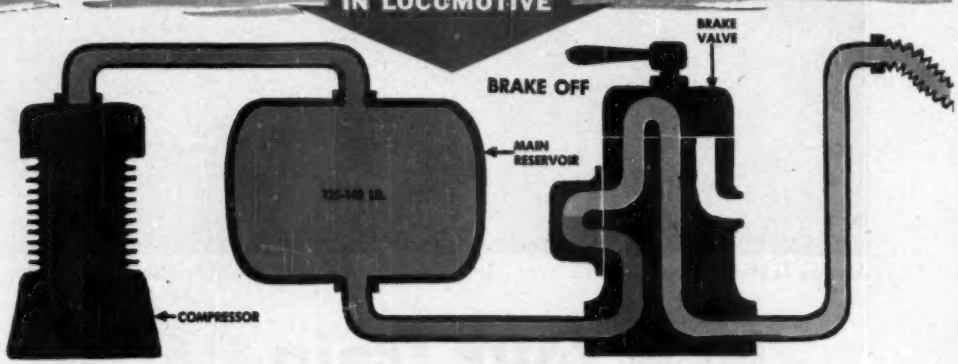
This admirable situation stems from an idea conceived by the great George Westinghouse 82 years ago. Up to that time trains were stopped by having brakemen rush from car to car setting handbrakes. This was so ineffective that trains did well to stop in the right town, much less at the station. Westinghouse read that compressed air was piped 3,000 feet to drill a tunnel in Italy and figured that it could be run the length of a train to apply brakes. It could be and he did.

But there's more to modern air brakes than substituting for a scurrying brakeman. There has to be, because bringing a long express to a fast, smooth stop is vastly different from reining in your sedan at a red light. Modern train brakes weigh the loads in each car to choose best braking pressures; adapt themselves to varying car speeds; and combine the brute strength needed to deliver millions of pounds of pressure with the delicacy needed to prevent a single wheel from

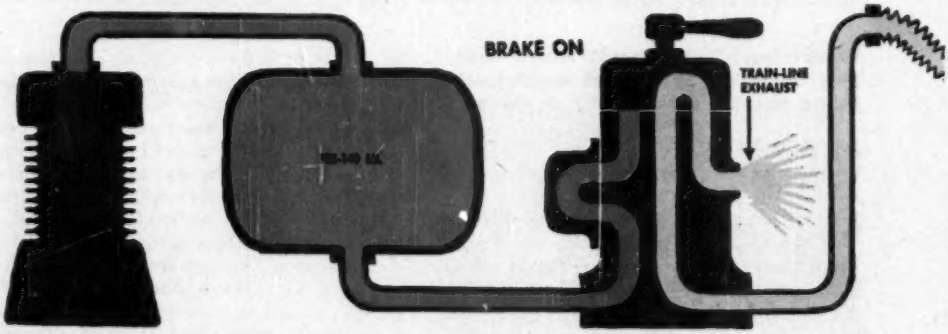


How Air Brakes

THESE PARTS IN LOCOMOTIVE



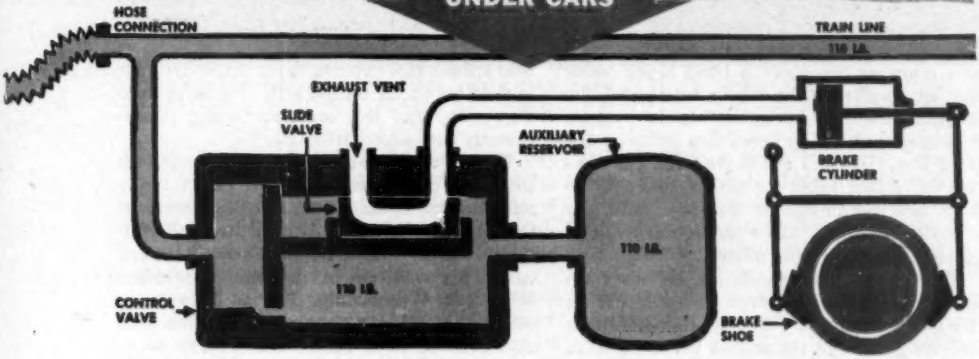
1 Brakes Off. This schematic diagram across two pages shows principle of modern air brakes. Locomotive air compressor, usually steam-driven, automatically keeps up pressure in main air reservoir. Train brake valve, fed from it, is complicated rotary valve that acts as central braking control. Its primary job is to vary the pressure in the train line, which is a continuous air connection back to the end of the train. Here the train valve is in "brakes-off position" and is delivering air pressure of about 110 lb. per square inch to train line.



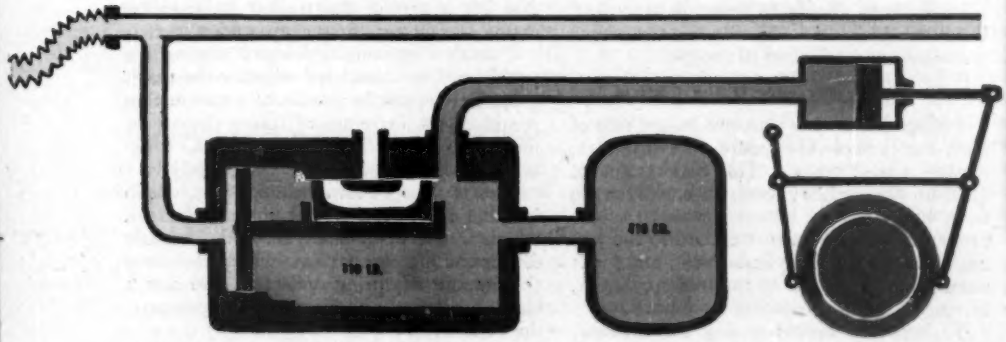
3 Brakes On. To make a fast stop, engineer swings over train brake valve, cutting off air from main reservoir and blowing off pressure in the train line. The valve position shown in the diagram is known in railroad lingo as "the big hole" and is the one used for emergency stops. For more moderate application of brakes, engineer moves handle to "service position," which causes a more gradual reduction of train-line pressure. He can also move lever to "lap position," which holds line pressure at reduced level for steady, moderate braking effect.

Bring an Express Train to a Halt

THESE PARTS UNDER CARS



2 **Train-line air** has entered the car control valve above, pressing the piston inside to the right. This opens a feed groove at bottom of piston, letting air past to charge up the auxiliary air reservoir—there's one in each car—to train-line pressure. Compressed air is excluded from line to brake cylinder, which is vented to outside air. Brake shoes do not press on wheels in this position, which is normal one when train is running under pull from the locomotive. Any slight air leakage is made up via train line from the main reservoir.



4 **Falling pressure** in the train line triggers brakes by means of car control valve. Lessened line pressure moves piston to left, closing feed groove and preventing loss of auxiliary-reservoir air to train line. Slide valve uncovers port leading to brake cylinder, and auxiliary-tank air moves brake piston. This operates linkage to force brake shoes against wheels. Release of brakes is reverse of this process: train-line pressure rises, control piston slides back, cutting off and venting brake cylinder. Line recharges auxiliary reservoir.

locking and sliding along the slippery rails.

The first air brake worked in the obvious, positive way: air from the locomotive actuated brake cylinders in each car that applied brake shoes to wheels. The difficulty here was that if the train line or the train itself broke apart, air escaped and there was no braking power at all.

Within a few years Westinghouse devised a negative-action brake, the kind still used, in which locomotive air feeds reservoirs in each car and also acts as a control. With this system rupture of the line or train causes all brakes to set automatically.

How to Stop a Train

Let's see what happens in a train when the engineer moves the brake lever. Up in the locomotive there's a big air compressor and main air reservoir, a train brake valve that quarterbacks the whole team, and the locomotive's own "personal" brake system. Running back are air hoses that make up the train line. In each car there's the car control valve that takes the orders sent via the train line, an auxiliary air tank, and the brake cylinder that does the actual work of pressing shoes against wheels.

When the train is made up, air hoses are linked and the reservoir in each car is charged with air at 110 pounds per square inch in passenger trains and 70 or more in freights. In each car the control valve feeds the train-line pressure to the auxiliary reservoir, and opens the brake cylinder to outside air, releasing the brakes.

When the train is moving and the engineer moves the brake lever to service position, air from the main reservoir is cut off from the train line. Simultaneously, some train-line air is allowed to escape.

Train-Line Pressure Is the Control

Reduced train-line pressure on one side of each car control-valve piston moves it over, closing a feed groove. This bars escape of air from the auxiliary reservoir back into the train line, now at lower pressure. At the same time a slide valve attached to the piston closes the brake-cylinder vent, and feeds auxiliary-chamber air to the brake cylinder, forcing brake shoes against the wheels.

To keep the brakes on just this amount, the engineman moves his lever to lap position, which stops loss of air pressure from train line and movement of air into brake cylinders. For increased braking, he returns it to service position, line pressure falls further and more air enters the brake cylinders.

For an emergency stop the lever is thrown into emergency position, causing rapid loss of train-line pressure and a rush of all reservoir air into the brake cylinder.

Present brakes have a larger car reservoir, divided into service and emergency sections. Routine braking is as described above, but when an emergency stop is necessary, air at maximum pressure is loosed from both tanks into the brake cylinder.

This emergency air also performs an important function in hastening the release of the brakes, which is done by reversing the application procedure. Train-line pressure is raised, the control valve disconnects reservoir and cylinder, opens the brake cylinder to exhaust, and permits the train line to recharge the reservoir. The two-part reservoir speeds this process; both brake-cylinder and reservoir air temporarily discharge into the train line, the reservoir being subsequently recharged from it.

That's a bone-bare description of air brakes. Today there are some pretty fancy refinements. Brake power must be varied so that it will work equally well on a 30,000-pound empty and a 230,000-pound loaded car. This was one of the many problems solved in Wilmerding, Pa., a little town where the Westinghouse Air Brake Co. makes most U. S. railroad brakes.

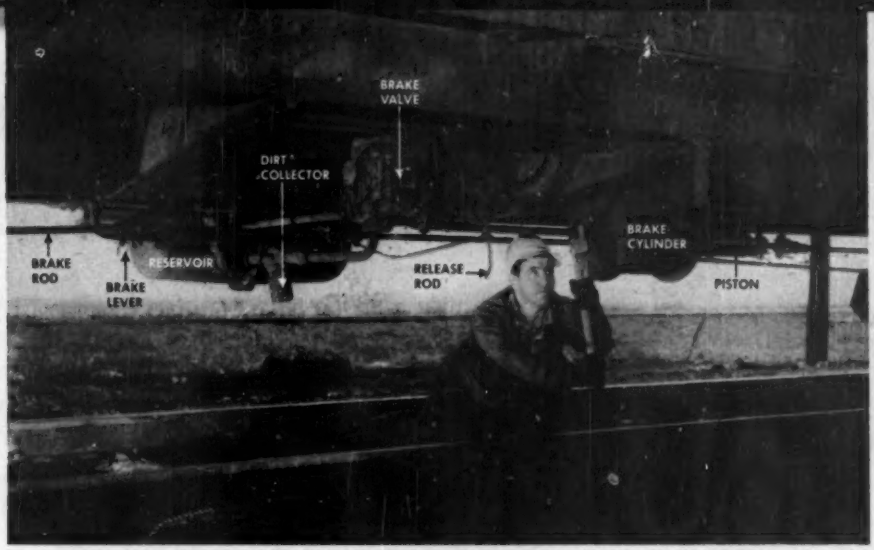
Slack Snaps the Whip

If brakes do not work uniformly, slack action between cars can build up so forcibly as to damage cars and loads. Slow braking in rear cars may cause them to plow ahead and lift a car off the tracks; slow release action in rear cars may snap a train in two.

Two devices were developed to meet the problem. One ascertains whether the car is loaded or empty by means of a piston that measures the extremes of spring deflection, indicating empty or loaded condition. Braking force is automatically set accordingly.

This is all right for a coal gondola, which is either empty or full, but not for a boxcar, which might be partially loaded. A more discriminating mechanism, which measures the amount of spring deflection and sets a valve for exactly the right brake pressure, does the trick.

Subway brakes call for a similar mechanism. Here slack isn't as important, because there isn't as much of it. However, brakes must stop a subway train just as fast when it's jammed as when it's empty, since trains



The components of an individual freight car's brake system are closely grouped and clearly shown in this "below decks" photograph. The railroad worker is tightening a connection.

fit their stations snugly and a motorman may not know the size of his load. So Westinghouse has an answer: as doors open at each stop, the passenger load is "weighed" by an automatic control that sets the right brake pressure.

Payoff in stopping a train is on pounds of brake-shoe pressure compared to car weight. At speeds below 20 m.p.h., 100 percent of the weight in pressure is okay; above 65 m.p.h., 250 percent is required. How could the brakes tell how fast the car was moving?

The answer is to make axle r.p.m.'s electrical messenger boys. Now cars on some crack trains have special DC generators driven by their axles. The axle revolutions then produce voltage in proportion to speed. Through a set of relays, which react to different voltages, the brake-cylinder pressure is maintained exactly right at all speeds.

Problem: Which Wheels Are Skidding?

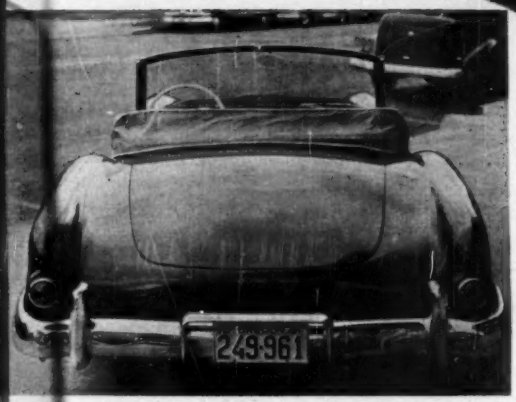
If your car skids as you brake on slippery pavement, you ease up on the brake pedal, permit the wheels to turn again, and regain braking efficiency. In railroads, it's also important to minimize the locking of wheels. But the engineman doesn't know which cars are sliding—and he wouldn't want to release all brakes to unlock a few wheels.

An ingenious gadget was invented that senses when wheel deceleration is rapid enough to mean locking. Mounted on the end of each axle, it employs an inertia wheel that unseats a valve when the retardation rate is too great. This relaxes brake-shoe pressure and the wheels pick up speed. The Decelostat has contributed heavily to the silk-smooth operation of crack trains.

Changes of air pressure in a train line move at 650 m.p.h., which is fast, but it means that an engineman's "order" takes a second and a half to reach the last car of a 17-car train. So an electro-pneumatic system has been devised in which electricity carries orders at 186,000 miles a second to solenoids, in each car, that work control valves. This most precise brake system switches off a light if a circuit is broken and enables the engineman to locate the break at once. He can then switch to conventional air operation at the turn of a lever.

Westinghouse's most impressive research tool is a test rack incorporating all brake equipment for a 150-car train, with 7,500 feet of train line coiled in its 100-ft. length. It can duplicate every condition encountered in stopping a long freight train. The men of Wilmerding can make up to 12,000 brake sets a month, worry about such diverse problems as developing a 60,000-hp. braking system for a South American ore-carrying line and how to keep wasps from nesting in brake valves in Wyoming. They've also built a locomotive brake valve that whistles like 22 starving peanut vendors if the engineman takes his hand off the brake lever, and after four to six seconds sets the brake automatically. END

Patchwork Sports Car Hits 105 M.P.H.



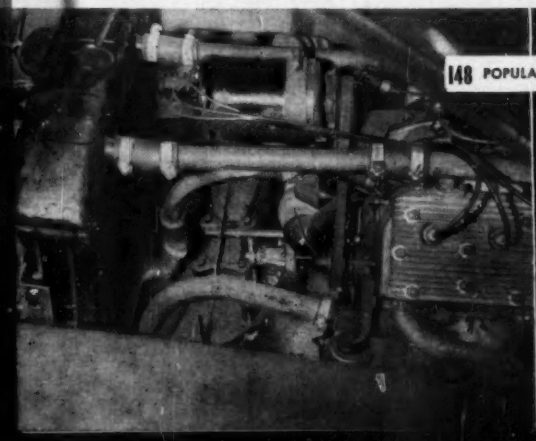
Airplane shocks aid rear springing. Trunk, hood, cowl, and doors were formed by hand from 10-gauge molybdenum steel. In top photo builder is shown alongside his auto creation.

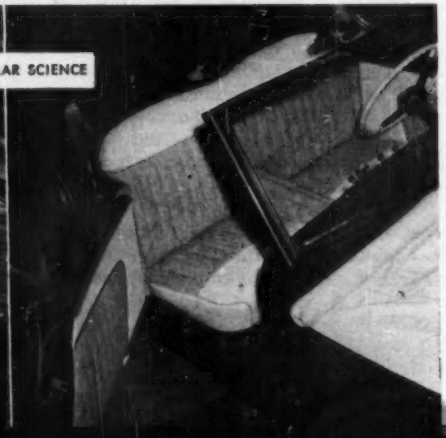
PRODUCT of a year's spare-time work, this homemade sports car was built by Tom Story, foreman of a body shop in Portland, Ore. With a wheelbase of 97 inches, the car is really low-slung: the top of its Lincoln windshield is only 46 inches above the street, though the car still clears the ground by 5 inches. Its engine is a reworked Ford V-8 "60" with twin carburetors. It now puts out 113 hp. at a compression ratio of 10½ to 1.

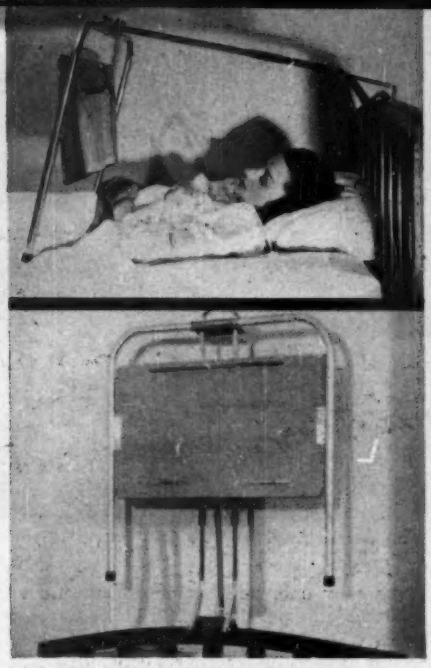
Story used the springs and rear axle from a Willys, a Mercury grille and steering wheel, Chevrolet front fenders, and the rear fenders from a Pontiac. The 2,080-lb. car has been clocked at 105 m.p.h.

Special heads and other modifications almost double power of Ford engine. It's mounted well back of the radiator for better balance and increased traction on rear wheels.

Floors and seats are built so low that the drive-shaft tunnel serves as an arm rest in center. Upholstery is yellow and white plastic material. Outside finish is green.







Lie-Down Patient Gets Table

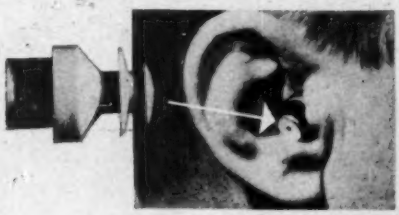
To BRING comforts within easy reach of a patient who cannot sit up, a Seattle inventor, Paul A. Carlstedt, has devised the Li-Abed Table. Attached to a bed and counterbalanced by a spring, it may be swung into place or out of the way (lower view) by the patient. A panel holds a book for reading (top view); reversed, it has a mirror for make-up or shaving, and pockets for toilet articles.

Snow Gauges Predict Run-Off

How much water will this winter's snows supply to spin turbines and irrigate ranches next spring and summer? Snow gauges, on 15-foot towers dotting California mountains, tell the story. Atop each tower an open container, holding a measured amount of salt water, collects and melts falling snow. Power-company men check the depth of liquid with a measuring stick, above, to predict the coming run-off.

Ear Valves Strain Out Noise

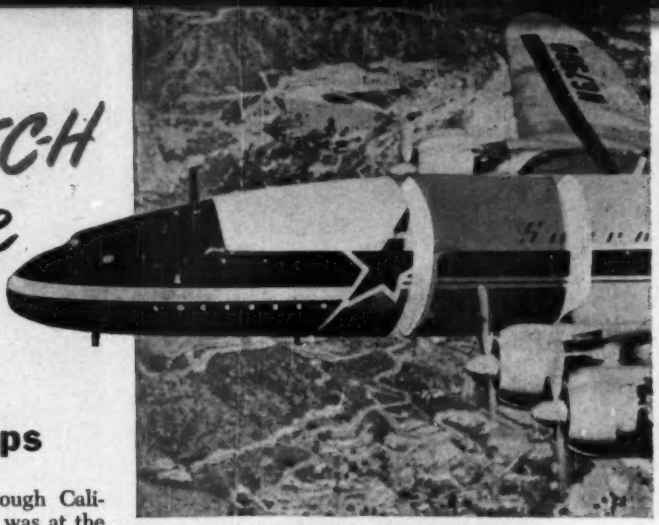
WORN like ear plugs by workers and troops, "sonic filters" exclude loud noises without obstructing weaker ones. Wearers can converse in normal tones in a riveting plant or under gunfire. A sensitive quick-acting valve in an air passage closes momentarily in response to the sudden air pressure of a sharp noise, and then reopens. The precision-built device, called the Lee Ear-Valv, sells for $4.95 a pair.



Trailer Strings Power Lines

THREE power lines slide simultaneously over crossarms when the Southern California Edison Company's triple-reel trailer, below, goes into action. Wire being strung, fed from a trailer at one end of a working section, is drawn taut by this trailer at the other end. A Chrysler industrial engine powers all three reels. Two men turn small wheels operating guides that keep cables moving evenly across drums.

HOW TO S-T-R-E-T-C-H AN AIRLINER



Lengthened liner had 10 feet added to the

Super Connie Set for Turboprops

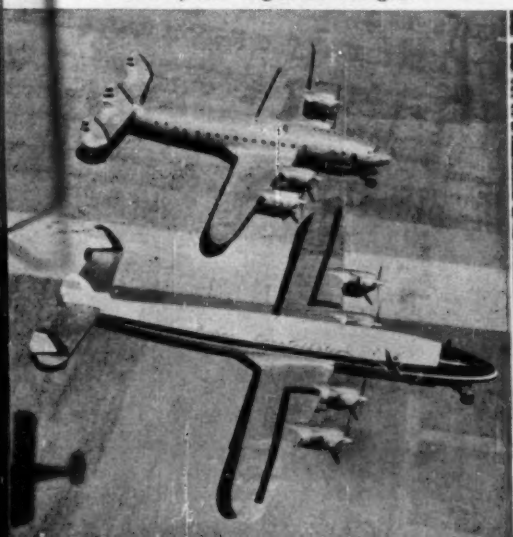
RECENTLY there soared through California skies an air liner that was at the same time the newest to take wing and one of the oldest now flying. The triple tail clearly identified the ship as a Constellation. But something had happened to the fuselage. The passenger compartment had been stretched some 18.4 feet to produce the prototype of a new plane, the Super Constellation.

Lockheed officials had decided that they needed a plane to bridge the gap between present piston-engined transports and the all-jet jobs now on the drawing boards. Such an in-between type would meet competition on the world's airways until jet transports were actually here. And by rebuilding an existing plane instead of designing a new one, millions of dollars and at least three years' time could be saved.

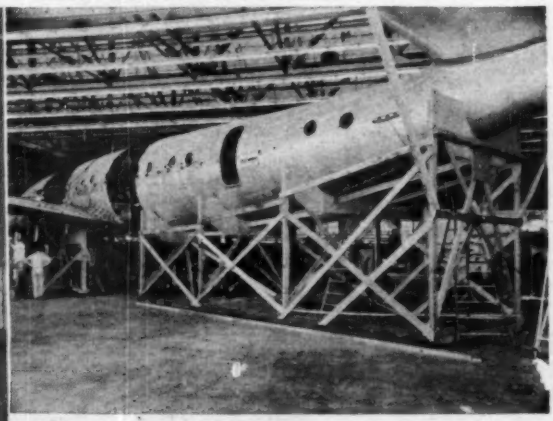
After studying what this transition plane would have to do, engineers concluded that an elongated Connie might fill the bill. So they took an old ship—coincidentally, the first Constellation ever built—and went to work on it.

First they built three supporting cradles, one under the nose section, another under the wings, and a third under the tail. After removing floor beams and wiring, they took a portable electric saw and sliced the fuselage completely around in two places. One

The new Super Constellation seems to dwarf the present Connie beyond it. Yet wing span of 123 feet and height of 19 feet remain the same. Only the length has changed.



Cut-apart plane is supported by special wooden cradles. New stringers and skin section were overlapped a foot for added strength. Entire rebuilding job took four months.



nose section and 8.4 feet added behind the wing. New length of plane: 113 feet, 7 inches.

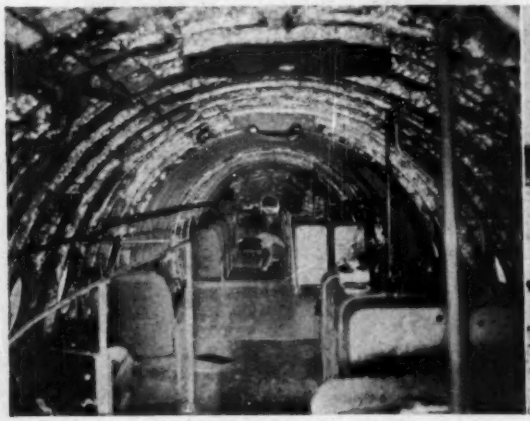
cut was made just ahead of the wing and the other just behind it. The resulting three sections were then separated a predetermined distance. New stringers and rings were added in the open places and a new aluminum skin section—tapered to conform to the original contours—was riveted in place. The total length added was 220.8 inches.

Over-all length of the new transport is 113 feet, 7 inches. It can now accommodate as many as 110 passengers, 41 percent more than the old plane. Baggage and cargo capacity has been upped 72 percent. Additional changes include a combined electrical and pneumatic de-icing system, and wing-tip fuel tanks for long flights.

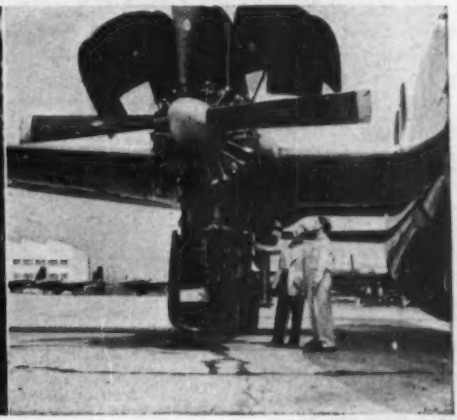
Basic power plant in the production models will be four 2,700 hp. Wright Cyclones. But the engineers are looking ahead. The ship can also use 3,250-hp. compound engines—piston jobs with exhaust turbines. Finally, the ship can take turboprops when they get the nod for passenger use.

With turboprops, the 65-ton giant will cruise at better than 400 m.p.h. Lockheed, with $50,000,000 in orders already on the books, expects to start deliveries late this year. END

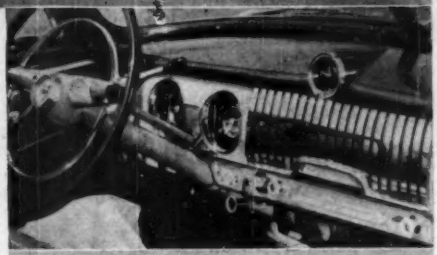
Main cabin is 83 feet long. Crinkled aluminum foil is used to insulate the pressurized plane against low temperatures at 30,000-foot altitudes. Tanks carry water ballast for tests.

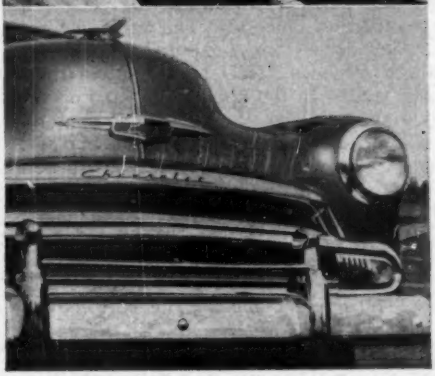


Compound engines like this one will boost the 2,700 hp. of 18-cylinder Wright piston engine to 3,250 hp. Wings are strong enough to take even more potent turboprop engines in future.



New Chevvie Looks Sleeker

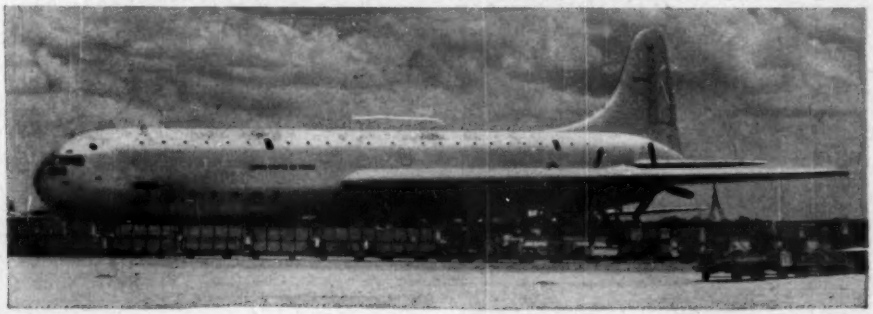


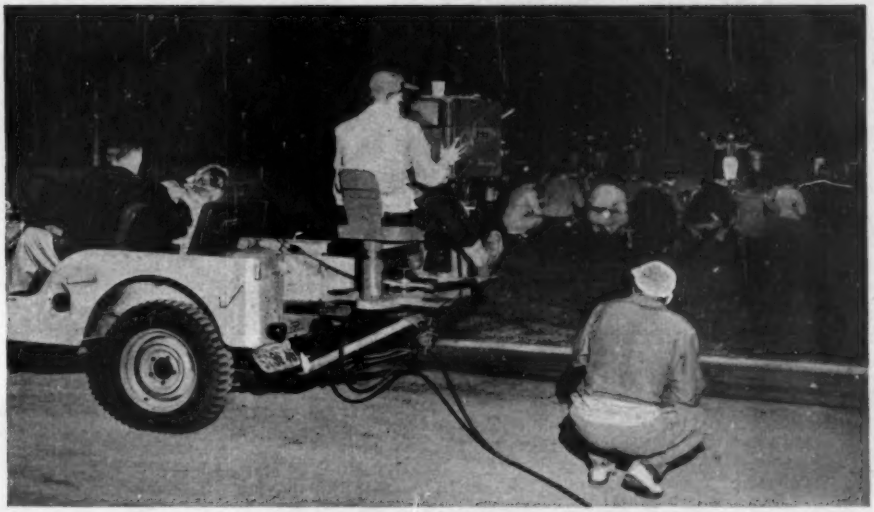


LONGER, lower lines and bigger "Jumbo Drum" brakes highlight a general facelifting job on the 1951 Chevrolet. The new brakes are self-energizing and, according to the manufacturer, require 25 percent less pedal pressure. Rear-fender crowns have been raised and the amount of chromium trim on de luxe models increased. The convertible features a big rear window of flexible plastic, tripling visibility in that direction. For safety all control knobs are recessed beneath the instrument panel. A rounded ledge above the panel protects the windshield from instrument-light reflections. The radiator grille has been restyled and simplified, with the two lower bars extending across the fenders to form a semicircular frame for the parking lamps. Bumper guards and hood ornament are restyled.

Double-Deck Aerial Freighter Breaks Load-Carrying Records

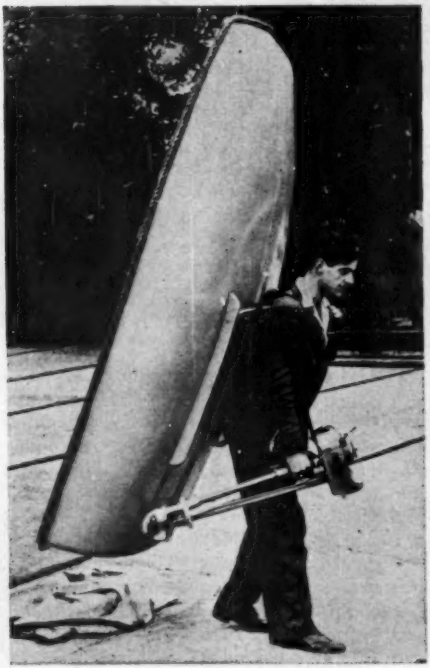
BY FLYING 50-odd tons of cargo halfway across the continent on an Air Force test mission, this XC-99 transport has broken all load-carrying records. The 200,000-ton-mile total would require twenty C-47 transports. Photo shows the new double-decked air freighter and some of its load, which included forty-two 2,300-lb. plane engines.





Jeep TV Camera Gets the Action

FAST-action football and other sporting events leap smack into the living room through the jeep television camera above. The mobile rig follows athletes for thrilling close-ups, while other cameras get views at medium and long range. Sid Sanner, engineer for station KTTV in Los Angeles, contrived the mounting by removing the panning assembly from a TV dolly and installing it on a jeep trailing 800 feet of cable.



Glass Boat Weighs 75 Pounds

ONE man can carry the lightweight boat at left, and its motor too. Designed by a British inventor, this three-seater dinghy has a molded hull of spun glass mixed with expanded ebonite, and weighs only 75 pounds. A ½-hp. outboard motor propels it at four m.p.h. A carrying harness aids in transporting it to and from the water.

It's a chimney broom. The steel-bladed brush collapses to the folded position shown, so that you can push it all the way up a chimney from your kitchen or basement with a 40-foot steel push rod. When it has reached the top, you pull down and the brush opens, scraping soot out of the chimney. Called the Collapso and sold for $4.95, it has been introduced by the Flour City Brush Co., Minneapolis, Minn.

Power-lift cab on new White truck can be raised at the turn of a key in less than 30 sec. to give mechanic easy, bench-high access to all parts of the engine.

Truck Cab Tips Up for Service

PS PHOTOS BY HUBERT LUCKETT

ALTHOUGH it may look like a conventional cab-over-the-engine truck or trailer tractor, the new White Motor Company version has a power-lift cab that simplifies engine maintenance and repair. Unlocking and operating a conveniently located control handle lets you raise the cab quickly to give easy access to the engine and accessories. Ingenious linkage and universal joints make it unnecessary to disconnect any of the driving controls such as the steering column, gear-shift lever, or brakes before raising the cab to its tilted position.

Cab control is located under the rear of the cab on the right-hand side. The ignition key unlocks the control. Twisting the handle forward or backward raises or lowers the cab.

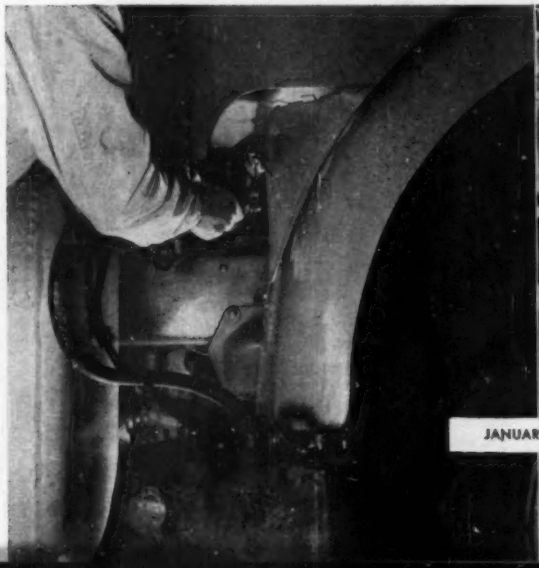
Lifting mechanism, consisting of an electrically-operated screw jack (center), is a modified version of the mechanism used to actuate the landing gear on many large airplanes.

Ease of maintenance was the target in designing the new power-lift cab. Ventilation panel on front of cab opens up to provide handy access to the rear of the instrument panel.

Daily maintenance, such as water and oil checks, can be taken care of easily through access door on the side of the cab. The cab design gives the driver excellent visibility.

Emergency electric power, for lifting the cab in case the battery goes dead, can be obtained by connecting a spare or stand-by battery to a power connection under cab-control handle.

Two-speed rear end provides for a range of ten speeds. To shift from one range to the other in each of the five shift-lever positions, driver simply moves button on side of lever.



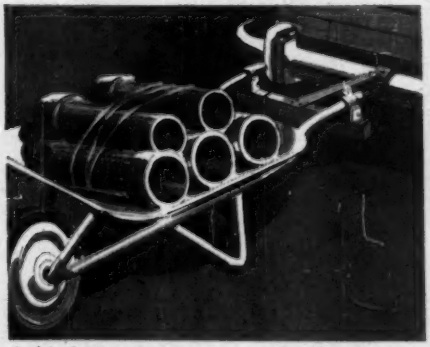
I'd like to see them make . . .

Everyone has his own pet idea of some gadget he would like to see in general use. What is YOURS? *Popular Science* will pay $5.00 for each one published. Use government postcards only. Contributions cannot be acknowledged or returned.

Lighter-fluid cans with built-in screwdrivers sized to fit the filler screws in cigarette lighters. This would eliminate hunting for a screwdriver —or even fishing for a coin—every time you fill up.—*Sam Shelton, The Bronx, N. Y.*

Rubber tire patches with tabs on the fabric separators that cover the sticky surface. By grasping the tab and pulling, you could easily detach the fabric from the rubber patch.—*Edward Olasz, New Brunswick, N. J.*

A pressure canner with a spigot. Then, after the cover is removed, the hot water could be drawn off. No need to lift the heavy water-filled canner or to remove the jars until cold.—*Mrs. E. Meneghini, Norway, Mich.*

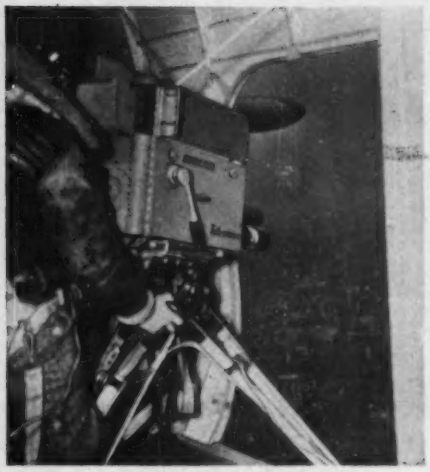


A hitch for converting a wheelbarrow into an automobile trailer. Would serve fine for carting garden debris and other trash for dumping, saving interior of car from scratches and dirt.—*Gilbert Roberts, Albany, N. Y.*

Ready-made frosting in disposable plastic tubes, made to fit interchangeable decorating nozzles. Would eliminate fuss of making frosting and filling and cleaning fabric or metal gadgets.—*Patricia McGrath, Essex, Conn.*

Treated Gun Case Prevents Rust

THE hunter above is using a Pro-Tek gun case to keep his shooting iron from rusting. It's made of a heavy, machine-stitched paper that has been impregnated with a new chemical, called VPI and developed by the Shell Oil Company. Its vapors do not absorb water but chemically inhibit rust. It's sold for $1 by Pro-Tek, Burlingame, Calif.

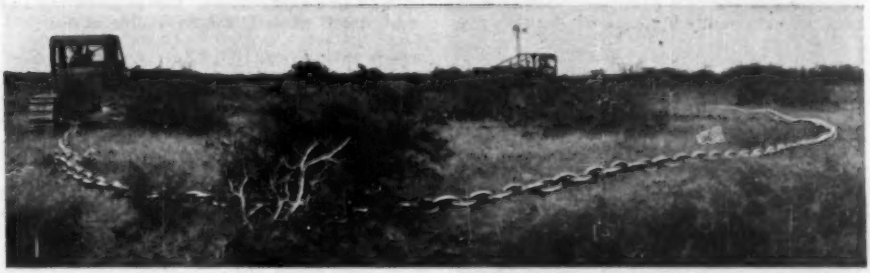


London Televised from Plane

LONDON TV fans got a bird's-eye view of their home town recently without leaving their armchairs when the British Broadcasting Corp. sent a television camera crew up in a Bristol cargo plane (above). A portable transmitter in the airplane relayed the aerial scene down to the ground station during the experimental telecast.

Homemade Racer Hits 176 M.P.H.

ONLY 17 feet long, the tiny racing plane at left was designed, built, and flight-tested by Neal Loving, of Detroit, a double amputee. The midget racer, which has done 176 m.p.h., has unusual inverted-gull wings that double as part of the undercarriage. It also sports such special instruments as a stall indicator and an electric lap counter.



Land Cleared with Battleship Chain

THE mammoth 25,000-pound chain shown above is dragged along by two 148-hp. Diesel tractors to clear Texas pasture lands. Trees up to 22 inches in diameter are easily ripped from the earth by the 262-foot chain that once hauled a battleship anchor from the ocean bottom. It's said to clear 40 acres of ground in an hour.

To create one of San Francisco's famous cable cars, TV needs only a couple of "flats," a platform, and a movie screen. Movie background of real street scene is faintly visible at the left.

Movies Put San Francisco in New York TV

PS PHOTOS BY W. W. MORRIS

FOR 19 years the color of the San Francisco locale has been a hallmark of the radio story "One Man's Family." That the program was actually broadcast from Hollywood didn't matter much to the audience or the producers. On television it's not so easy.

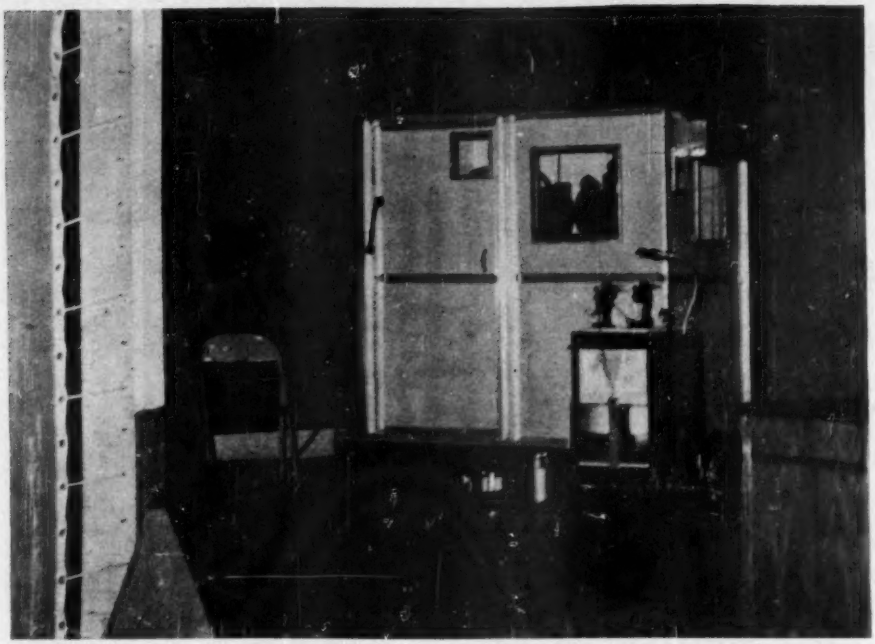
To preserve the San Francisco flavor in the video version—staged inside a converted movie studio in New York—the show's originator, Carlton E. Morse, called on photography for help. In San Francisco, photographer Ray Moulin shoots stills and movies.

From approximately same angle used by TV camera, top picture shows how cable car looks with movie background off. Lower photo shows effect of switching on projector, behind screen.

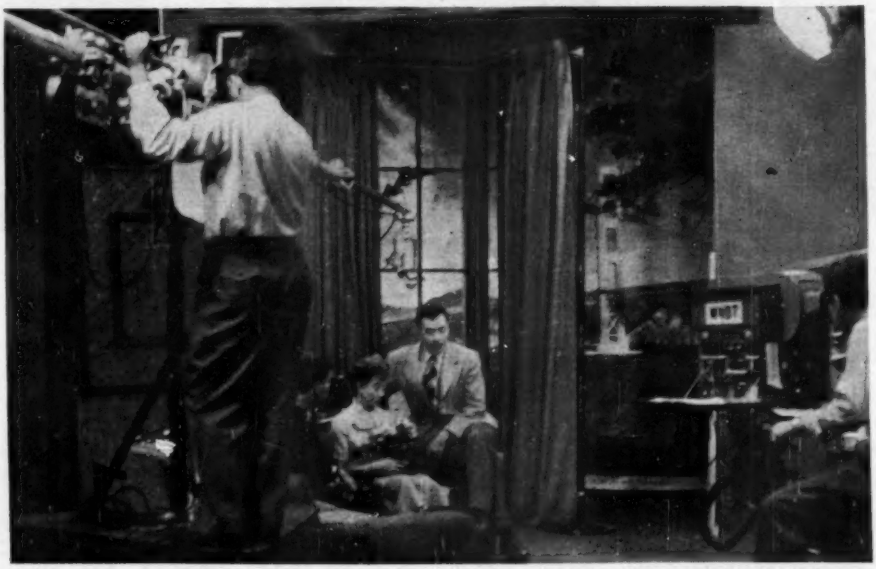
In New York, these pictures are combined with actors and simple but imaginative sets to bridge the 3,000-mile gap.

The TV audience sees the familiar characters—in New York—but against settings unmistakably San Franciscan, such as inside a cable car moving up the steep hills, in a speedboat in the bay, or in a living room with Golden Gate bridge seen through a window. How video magic does the trick is shown in photographs on this spread and on the next page.

This is what the audience sees: Claudia and Cliff in a cable car moving up a San Francisco street. Photo was shot from receiver screen.



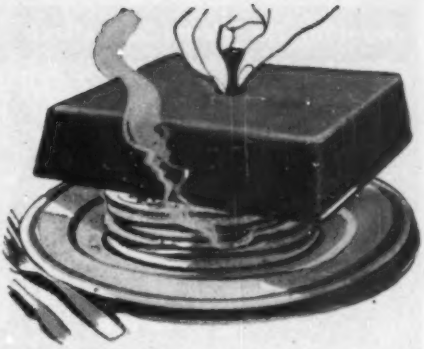
Special Holmes 16-mm. projector, in portable soundproof booth, is used by N.B.C. to create movie backgrounds. Projector, designed to convert 24-picture-per-second movies to match 30-picture-per-second TV scanning, is parallel to screen. Mirror changes light direction.



Still photographs help create the San Francisco atmosphere, too. In picture above, giant enlargement of a view of the Golden Gate bridge can be seen behind the "windows" of the set. Photograph gives an unusual effect of depth, making a realistic scene when televised.

Keeping the Home Shipshape

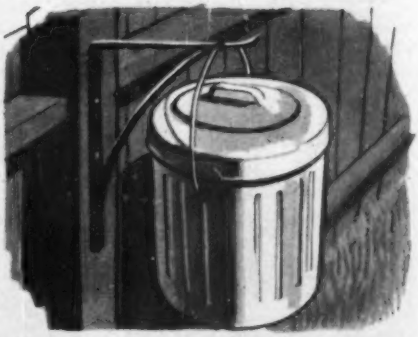
Hate to clean the electric stove? Cover the reflector pans under the burners with aluminum foil. Foods that spatter or boil over will be caught by the disposable foil.



Is your family fond of pancakes or french fries? To keep the platter hot between servings, cover it with a deep cake pan. Screw a knob in the bottom for easy handling.

The cords on metal Venetian blinds wear out from rubbing against the sharp edges. If you wax the cords by rubbing them over a block of beeswax, they will last much longer.

An emptied metal aspirin box makes a good depository for used safety-razor blades. When filled with blades, the covered box can be safely discarded with other rubbish.

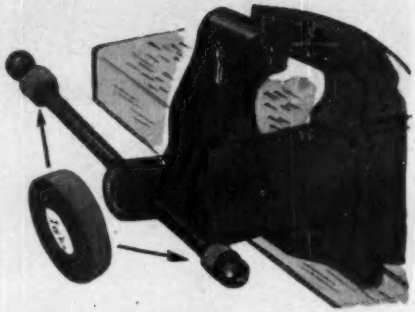


Hang your garbage pail from a back-porch upright or a fence post. Lifting it from the ground prevents dogs and cats from upsetting the can and also keeps the bottom dry.

Please turn the page for five more suggestions.

Keeping the Home Shipshape

To make cellar stairs or slippery outdoor porches skidproof, mix an equal quantity of fine white sand in the final coat of deck enamel. Stir frequently while applying.

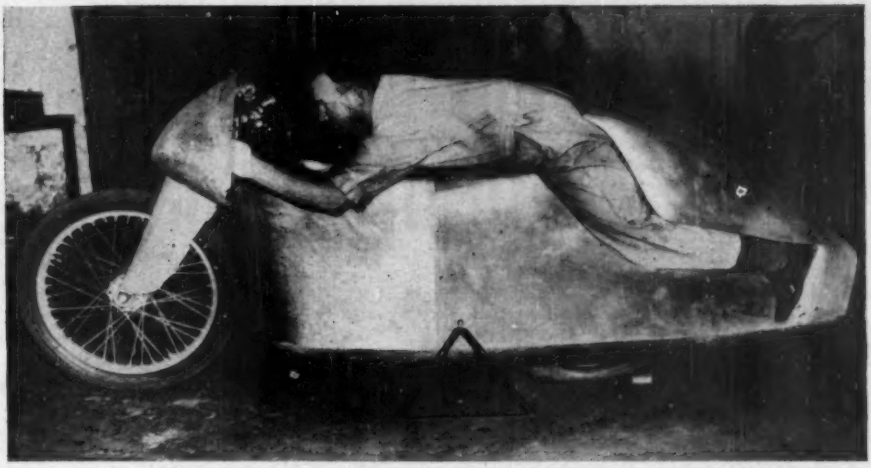


The handle of a vise often slides down with a bang and pinches the fingers. Wrap friction tape around the sliding handle just ahead of the knob on each end—no more pinching.

You can salvage those stubby pencil ends for further use with a bit of large radio spaghetti tubing. Two stubs with eraser ends butted in the tube then give you a two-ended pencil.

Discarded phonograph needles make good glazing points. Holding the needle shank flat against the pane, drive it down below normal putty line. Leave ¼" of shank exposed.

Baby foods are easily heated in Pyrex custard cups set in a pot of hot water. For a handy feeding tray, cut holes in a piece of plywood, glue on spools for feet, and coat with lacquer.



Prone Cyclist Seeks Speed

WHEN Victor Proctor mounts the motorcycle above, it fits him almost as closely as his clothes. For an attempt to break the world's speed record, pending as this was written, the South African racing driver has streamlined a two-cylinder Vincent machine. Lying prone to ride it, he tucks legs and feet into grooves in the metal fairing, reducing wind resistance to a minimum. Proctor holds the South African record at 136 m.p.h.

Nozzle Knob Adjusts Hose Spray

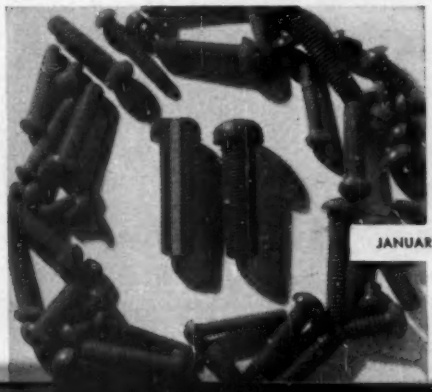
TWIRLING a knob on the garden-hose nozzle at left gives any of 27 varieties of spray, from fine mist to a full-pressure stream. A finger's touch also turns off the water at the nozzle. Said to be precision-built, durable, and corrosion-proof, the fingertip nozzle is offered by the Elkay Mfg. Co., of Beverly Hills, Calif.

Plastic Screws Are Strong, Too

MADE of plastic with metal cores, the new screws below combine advantages of each material. They eliminate insulating bushings and washers in electric switches and absorb vibrations in sound equipment. Metal cores give strength and contain the driving slots in the heads. Samples include one cut away to show the core. They're made by Forman Insulating Screw Corp., New York City.

Eye Shield Fitted to Torch

CLAMPED on an oxyacetylene welding torch, the eye shield below frees the user from wearing goggles, say two Shreveport, La., machinists who designed it. They say it's particularly useful to eyeglass wearers who need specially fitted goggles, or to beginners who must pause frequently to examine their work. The tinted lens is easily adjusted in a ball-and-socket mount.



Problem: How to Keep The UN from Sneezing

Gentle, man-made breezes in a different kind of wind tunnel are helping science to clear up a high-level smoke problem.

By Bill Reiche

PS PHOTOS BY W. W. MORRIS

LET aviation's supersonic wind tunnels move over and make room for a low-speed cousin that is making a major and unique contribution to science's war against atmospheric pollution.

In its breezeway test chamber, miniature stacks belch smoke that attacks model "victim" buildings, while scientists play tricks with the aerodynamics involved when smoke and air currents get together.

Everyone knows smoke is a dirty nuisance that cuts property values and is injurious to health. It has been a critical community problem in St. Louis, Pittsburgh, and Los Angeles, and a matter of concern in scores of other cities.

Precise firing of boilers and the use of a uniform grade of coal can cut the objectionable fly ash to a minimum, and electrostatic precipitators can remove most of the remainder. What concerns the conscientious industrialist are the invisible companions of smoke—fumes and gas.

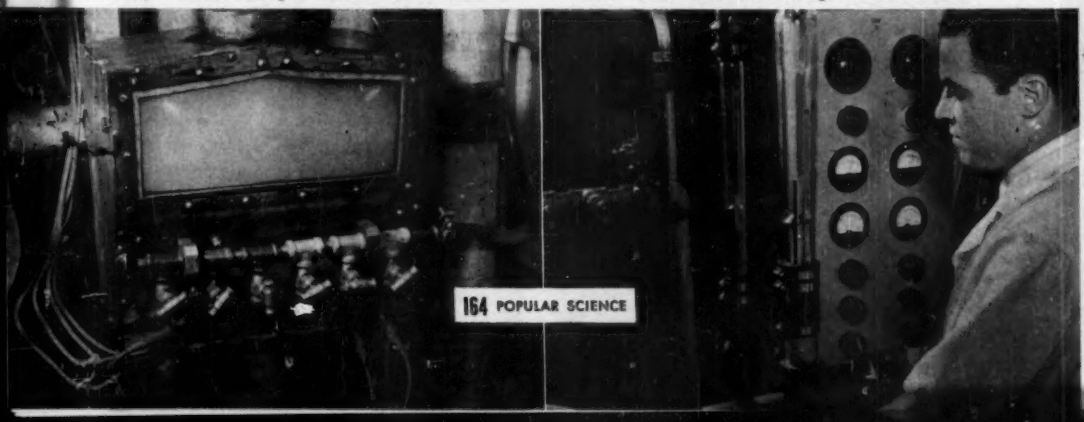
The problem is causing gray hair among the upper echelons of Consolidated Edison Co., the giant utility that provides New York City with electricity. It is conceded that the sulphur dioxide discharged as the result of coal-burning fires is neither pleasant nor healthful to breathe, especially when it reacts with moisture in the air. The 475-foot stacks of Con Edison's Waterside generating plant, on Manhattan's East Side, however, were considered tall enough to spew the gases harmlessly into the atmosphere. But that was before the United Nations erected its 540-foot Secretariat Building about 900 feet north. The new UN building is 100-percent air-conditioned, meaning that all its air is drawn in by fans at various levels.

The utility company was literally stinking up the premises of a distinguished international neighbor. Then the question was brought up of what the obnoxious gases and fumes might do to the handsome marble facing of the UN building. Con Edison quickly realized that it must step up its program of research into smoke and gas control.

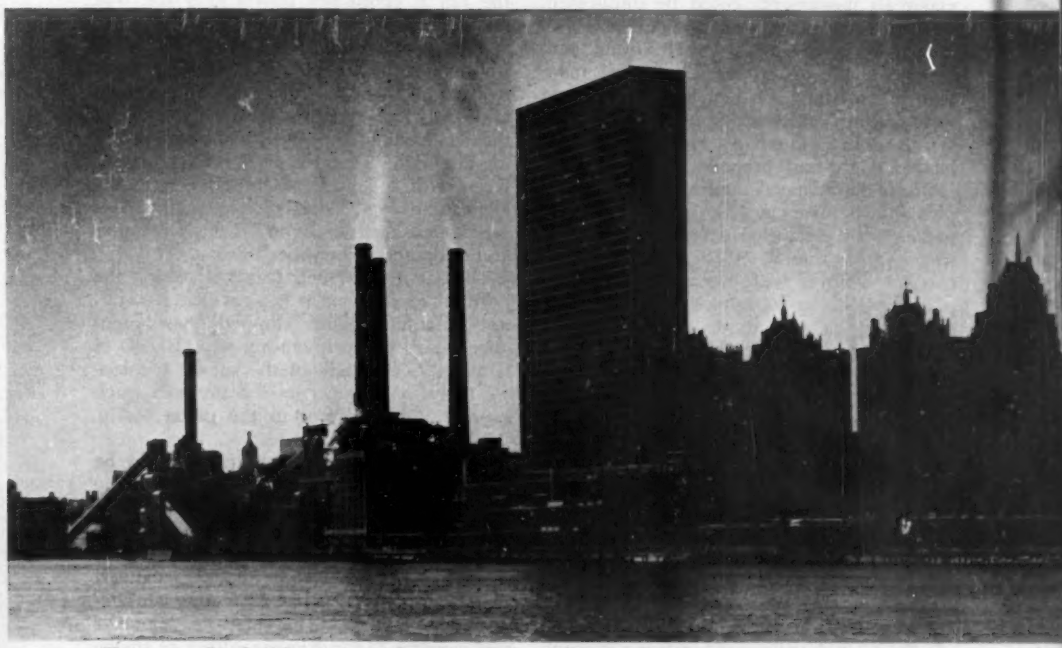
It had already commissioned the Research Division of the College of Engineering at New York University to build a wind tunnel

Electrically-heated coils in the smoke generator, below, turn oil into a fog that resembles stack gas, except that, being cooler, it is less buoyant than the product of combustion.

Three flow meters of various sizes, below, precisely measure air going through tunnel's stacks, since velocity of "gas" in relation to that of wind is of vital importance in tests.



The smoke tunnel in operation. Models above show how the Waterside plant shrouds the neighboring UN building with "smoke" that would be drawn into its air-conditioning system.



Here are the buildings, seen from approximately the same direction as in the tunnel above. The new skyscraper may, at the moment picture was made, have been "inhaling" sulphur dioxide.

An engineer towers over the "300-ft." stacks of an experimental model of Con Edison's proposed Astoria plant. Building shape and stack location have important bearing on smoke trail.

in which the actual physical factors and major air movements could be duplicated. Into the breezeway, built by NYU scientists headed by Professor Gordon H. Strom, went a model of the UN edifice. The tunnel, more than 50 feet long, 3½ feet high, and 7 feet wide, has a useful working length of 27 feet. Winds up to 25 m.p.h. are created by a four-bladed, eight-foot propeller powered by a DC motor. A speed control on the motor, plus fine adjustment of the exhaust vents, make possible hairline control of the wind speed in the tunnel. A 10- by 13½-foot intake is covered with three layers of fine plastic screening to reduce the turbulence of the air.

First step was to install building models in the working area. These include a smoke-producing unit, the "target" unit affected, and any nearby structures that could affect the smoke trail. The smoking unit's stack is connected to a pipe leading from the blower and smoke generator. Three flow meters of different sizes measure precisely the amount of air sent through the stacks, a critical factor since the velocity of the smoke in the stack is an essential element in the problem.

In the fog generator, oil is fed into electrically heated coils and emerges through tiny orifices, only 15/1,000 of an inch in diameter, as an invisible vapor. On hitting the air, it condenses into a gray fog that makes a visible "gas" trail.

The models of the Waterside generating station and the UN building are in the same relative positions as their originals. A turntable on which they rest is adjusted to bring the wind out of the southwest, the prevailing direction. Then the smoke trail emerges. Even with a considerably higher stack velocity than wind velocity, the smoke travels far enough horizontally to hit the skyscraper and eddy about its upper third.

Outside the tunnel, cameras record the position of the smoke trail, which is brilliantly illuminated and "stopped" by six high-speed flash lamps operating at 1/10,000 of a second. The path of the smoke is measured against squares on the far wall, each representing 150 feet in the plane of the smoke.

To find out how much push would be necessary to clear the target building, the stack-to-wind velocity ratio is varied from one to one up to six or eight to one. The real UN building has almost unbroken glass sides and gray ends. The model is painted black, with light stripes indicating air-conditioning intakes. This enables scientists and cameras to localize the eddies of smoke whirling about the structure.

There are a number of possible solutions to the problem. The stack height could be increased; the end of the stack could be modified to blow the smoke and gas higher; another fuel could be substituted for coal; or the offending sulphur dioxide could be washed out. Con Edison is interested in finding the most practical solution from the standpoint of initial cost, upkeep, and operating efficiency.

Removal of the sulphur dioxide by washing sounds like a sensible idea—except that it costs *$1 for every ton of coal burned*. This would represent a costly item, for the Waterside plant alone burns about 1,600,000 tons a year.

The NYU research originally involved a certain amount of crystal-gazing for its client, which is planning to erect a large generating station in Astoria, Queens, across the East River from Manhattan. In this instance, the problem is north winds in the winter time, since there is a large residential area south of the site.

Here the stack height is limited by the proximity of LaGuardia Field, with its heavy commercial air traffic. But, starting from scratch, there is another variable that can be used to advantage—the shape of the building.

Various structure shapes influence the smoke trails, since some create turbulence and eddies, while others do not. Location of stacks, on windward or leeward sides of the power plant, plays its part. It has been discovered that the ratio of stack to wind velocity may be reduced from 3 to 1 to 1 to 1, with equal results, if the building is designed with smoke control in mind.

New York University is also about to undertake research for the Atomic Energy Commission, which would like to know how atmospheric conditions will distribute radioactive waste gases from AEC stacks.

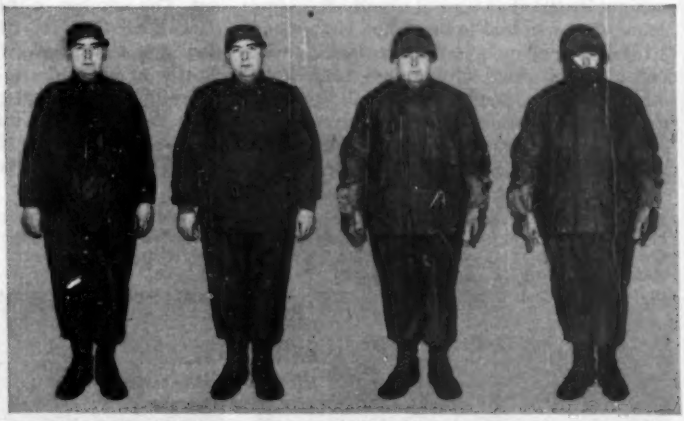
So far, the research group has learned a good deal about what happens to smoke and gas. It is now working on the matter of changing the velocity profile in the tunnel—varying the air speed at various levels. An attempt will also be made to devise an air stream that has different temperatures at different levels. Both are natural conditions, and will make the tests more realistic.

From this little wind tunnel may come knowledge that will mean cleaner air for more people. END

How a Soldier Keeps Warm and Dry in Korea

THE Army posed these pictures to show troops how to dress for combat in Korea's cold, wet mountains. The improved winter uniform, put on in layers, uses air pockets for insulation. Light, tough outer garments keep out wind and water; inner layers of wool hold body heat and soak up sweat. A new shoepac helps prevent trenchfoot.

Soldier puts heavy felt insole in shoepac worn over two pairs of wool socks.

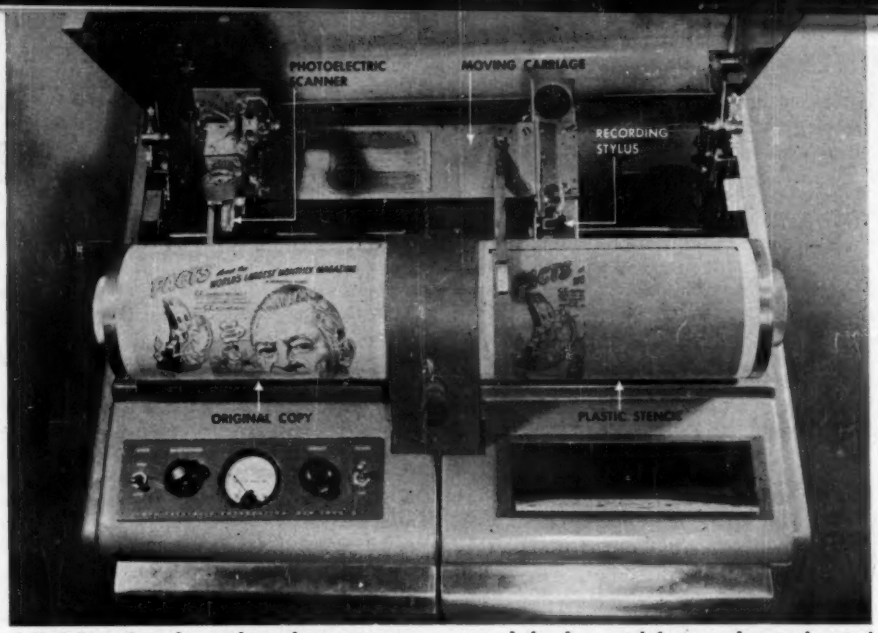


Under cotton field trousers (above) are underwear, shirt, trousers, sweater.

Pile jacket buttons close to neck. Cotton field cap has wool-lined ear flaps.

Field jacket of water-repellant, wind-resistant cloth completes outer layer.

Jacket hood buttons under helmet. Wool-lined mitten has "trigger" finger.



Called Stenafax, the machine above cuts stencils electronically. When the photoelectric scanner "sees" black on the original copy wound around the drum at left, it sends out electrical pulses, causing a stylus to perforate the plastic stencil wrapped around the drum at right.

Fax Machine Cuts Mimeograph Stencil

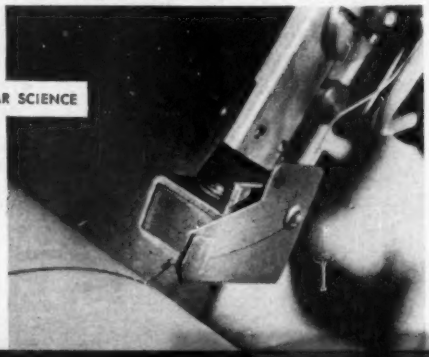
THIS new electronic facsimile machine makes exact copies of letters or drawings on stencils so they can later be mimeographed. Up to now, stencils could be cut only by a typewriter or a hand stylus.

The machine, called Stenafax, has two revolving drums that turn at exactly the same speed. The material to be copied is wrapped around one cylinder, and the stencil to be cut, a plastic sheet, is wrapped around the other. Then a photoelectric cell, moving slowly along the first drum on a carriage, scans the original material at the rate of 144 lines to the inch. When the scanner "sees" black, it sends an electrical impulse to a recording stylus that tracks on the second drum. The electrical charge, arcing between the stylus and the metal drum under the plastic sheet, produces a spark that burns a pinpoint hole into the plastic to form a black dot. The number of these dots provide gradations all the way from white, where no dots appear, to black, where they are packed closely together.

Made by the Times Facsimile Corp., of New York City, the machine cuts a stencil in six minutes. Over 10,000 mimeographed copies can be made from one plastic sheet.

To attach stencil to the receiving drum, bottom of sheet is first hooked into a slot, as below, then sheet is wound around cylinder. Opening in front of drum holds extra stencils.

Recording stylus is fine tungsten wire, 4/1,000 in. thick, that sends spark into plastic stencil whenever scanner "sees" black. Sparks burn holes into plastic, can make 6,000 a second.



MECHANICS *and* HANDICRAFT
REG. U. S. PAT. OFF.

The Best Ways to Mount TV Antennas

How long you keep getting a good picture depends on how you put up that aluminum signal catcher.

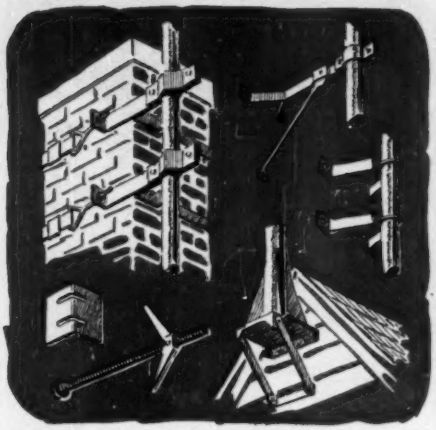
By Norman L. Chalfin

DRAWINGS BY RAY PIOCH

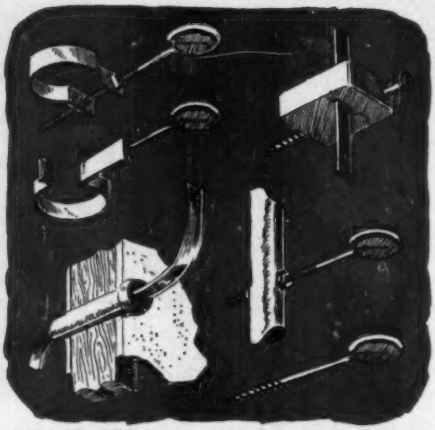
DRIVE down any street in old television territory, and you're likely to see antennas that look like dead trees. Some lean wearily and dangerously, some have bent or broken arms, and many swing and sway in ways that make clear reception almost miraculous. Passersby have been imperiled, architecture has been marred, and the eyes of TV viewers have been strained—for no reason other than poor installation.

TV antennas are not so very heavy or difficult to mount properly. Brackets galore are available for attaching them firmly to flat or sloping roofs, walls, or chimneys. Properly used, these attachments should hold a mast vertical for many years. Guy wires and lead-in ribbons can easily be kept from dangling like forgotten clotheslines. In fact, anybody able to make roof and gutter repairs can also put up a television antenna securely.

Wind and ice are the saboteurs that have wrecked many antennas. If a TV assembly sways even slightly in the breeze, the picture is affected; if a gale



BRACKETS. There's a size and style for every roof or wall. Corner guards under chimney straps protect brick and mortar. Toggle bolts hold best in wood, stucco, or similar walls.



STAND-OFFS. They keep down-lead spaced off masts and walls, hold it taut, bend it smoothly around corners. To bring lead into house, use porcelain feed-throughs (above, lower left).

twists the rods around, the picture may fade out completely. Ice collecting on the rods increases the surface that must withstand the wind's assaults and thus makes the antenna more vulnerable. A 50-m.p.h. wind applies 10 lb. of pressure per square foot, and when the wind rises to 100 m.p.h. the pressure per square foot soars to 40 lb. An ice formation that doubles the diameter of a rod may also increase the weight of a solid rod 150 percent and a hollow rod as much as 1,000 percent. Hence, the weather that you can expect where you live is one of the most important factors to consider when you put up a television antenna.

Why Make Your Own?

You can usually buy an antenna system as cheaply as you can make your own. If put where the TV signals can reach them, these antennas will generally do what the manufacturers say they will do. But they will not *stay* there unless they are supported adequately. And before you tackle the job, it's a good plan to check on local legal requirements from a building inspector and the fire department (which is sometimes concerned with guy-wire obstructions as well as lightning hazards).

The commonly used antenna systems are available in knockdown form, and only a few tools are needed to assemble them. Most of these kits include a 5′ or 8′ mast, usually a hollow aluminum or dural rod. Such a tube will withstand considerable bad weather if its walls are at least .040″ thick and it is 1¼″ in diameter. If more height is needed, 5′ extension lengths can be purchased.

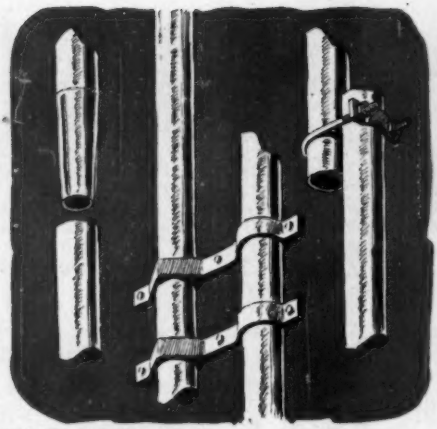
Wall Clamps and Brackets

Antennas having only a few arms on a short mast often can be attached to brick walls or roof parapets with U clamps or stand-off brackets. But these should be screwed to the wall. Holes can be made in the bricks—the mortar bond should not be relied on, because rain may loosen it—with a star drill, lead anchors inserted, and screws threaded into these. There should be at least two such brackets in every case and one every 3′ if the mast extends down the wall more than 3′.

Similar brackets can be used to hold a small antenna to the face of a gable end of a wood-sheathed house. This is often simpler than mounting the rig on the roof. But the brackets should be placed close to the pinnacle and attached firmly to the wood. Lag screws rather than ordinary wood screws can be used but expansion or toggle bolts are better.

Don't Wreck Your Chimney!

Chimneys are convenient things to put antennas on. But if the mortar is cracked or bricks are loose, a chimney should not be used unless it is first made solid enough to withstand the additional stresses that an antenna will place on it. Punching holes in



MAST CLAMPS. To gain height you can stack mast sections one above the other. Some types have nesting ends; others may be joined by clamps made to fit standard mast diameters.

GUYS. Support high antennas with three or four equally spaced, firmly anchored guy wires. Build out extra anchor point on roof if needed. Use strain insulators to break long wires.

a chimney, moreover, is likely to damage it. Straps with pipe clamps attached can be used, but the strap must be chosen and put on carefully. One that is too narrow may cut into the mortar, damage the chimney, and leave the antenna wobbly. A strap that is too thin may snap and let the mast fall on someone's noggin. Galvanized steel straps about 1″ wide have proved satisfactory in many cases—but inadequate, improvised straps have caused much trouble.

Never support an antenna by strapping its mast to another post or pipe structure with whatever you happen to have handy. Straps have a tendency to rust and stretch—and then slip. A pipe-clamp type of mounting unit in which the pressure is maintained by screw threads will usually hold heavy metal parts together much more securely.

Flat and Sloping Roofs

Flat roofs such as you find on apartment houses usually consist of several layers of material through which it is difficult to drive bolts, nails, or screws without letting water seep in. Setting the mast on a heavy wooden or metal base and guying it carefully may reduce the number of holes needed. Packing roofing compound around every screw that goes into a roof or frame wall will help to keep leaks from starting.

Several types of mast mountings are now available for installations on sloped roofs. Choose one that you know you can put up without damaging your roof or impairing the appearance of your home, if you must place your antenna on such a roof. Then guy it in at least three directions, even if this means that you must put an outrigger support at one end of the roof for a guy wire.

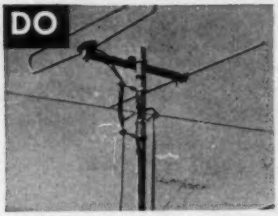
No mast should be anywhere near a power line. The minimum distance between an antenna and a power line should be at least eight feet more than the height of the mast. Every mast should also be grounded. Number 6 or 8 wire securely connected from the mast to a water pipe will serve. This does not eliminate the need for a lightning arrester in the lead-in itself.

How to Guy Antennas

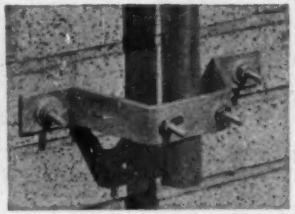
Every antenna more than 8′ or 10′ high should be guyed. The guy wires should be non-corrosive and of 300-lb. test strength, run if possible in four directions at right angles to each other, and be at an angle of about 30° from the mast. They should be attached to the upright pole with guy rings, and turnbuckles should be placed near the base ends. The tension then can be adjusted if the changes in the weather make this necessary. Too much tension may buckle a mast, so this must be done carefully.

On a tall, base-supported pole there should be a set of guy rings 5′ from the bottom and another set for every 8′ or 10′ of mast above. Ball-bearing rotatable guy rings are available for rotating masts.

When the guy wires are longer than the

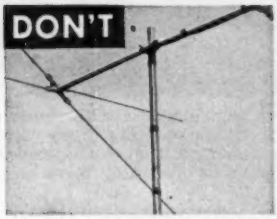


. . . Keep high- and low-band lead-ins 6" apart and on opposite sides of pole.

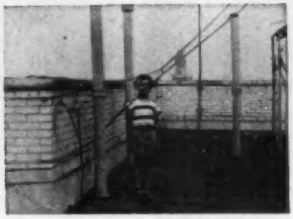


. . . Attach your mast mount to brick, not mortar. Use lead anchors in holes in bricks.

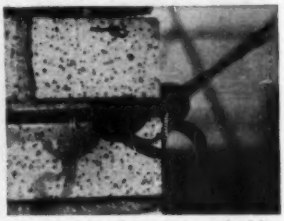
. . . Use porcelain tubes to bring lead-in through wall. And keep it short.



. . . Fasten a lead-in tightly to a mast this way. Use stand-offs.



. . . Place guy wires where children – or firemen – might run into them.



. . . Leave loops or coils like this in the lead-in near insulators.

length of the antenna's arms from tip to tip, strain insulators should be inserted. None of the lengths between these insulators should equal the over-all length of dipoles cut for the channels you wish to receive (PS, Sept. '50, p. 237) or multiples of those lengths. Guy wires of such lengths become parasitic and reduce an antenna's efficiency.

Attaching the Lead-In

Antenna assemblies often include 60 feet or so of 300-ohm lead-in ribbon. This is the type most commonly used, although a shielded type is better if you live in a "noisy" area—that is, one where considerable electrical disturbance is encountered. When the 300-ohm ribbon must be spliced, care should be taken to preserve the distance between the wires.

The best way to attach these wires to your antenna is to solder U- or ring-type lugs to the ends and bolt them to the terminals, using lock washers. Keeping the lead-in at least 3" away from the mast that supports the antenna will reduce the danger of losing signal strength. This can be done quite easily with cheap stand-off insulators.

The lead-in should be kept as short and straight as possible. Loops and coils in the ribbon can weaken your picture and put ghosts in it. When the ribbon is brought around corners, it should be done with stand-off brackets. And when it runs for any considerable distance it should be anchored often enough to prevent it from flapping in the wind, fluttering the picture.

TV receivers, like people, work best when they are well fed—and how well your set is fed depends to a large extent on how well your antenna is put up and connected to it. Doing the job right will improve the looks of both the pictures on your screen and the exterior of your home. END

Next month* Popular Science *will tell you what you should know about TV boosters.

How to Make Your Own Rubber Stamps

LARGE block letters, numerals, or symbols for stamping signs and placards may be easily made from a discarded inner tube. Draw or trace the letters on pieces of the tubing and cut them out with a sharp razor blade, using a ruler as a guide. Cement the letters to a wood block in reverse order and face down, as shown, and ink with a stamp pad.

When closed (above), desk takes up but little room. It's only 8″ deep. Yet, when it's open (right), there is a big writing area and roomy compartments for paper, envelopes, and other writing supplies.

Wall Desk Built in Half a Day

A handyman's answer to the high cost of furnishing a home comfortably.

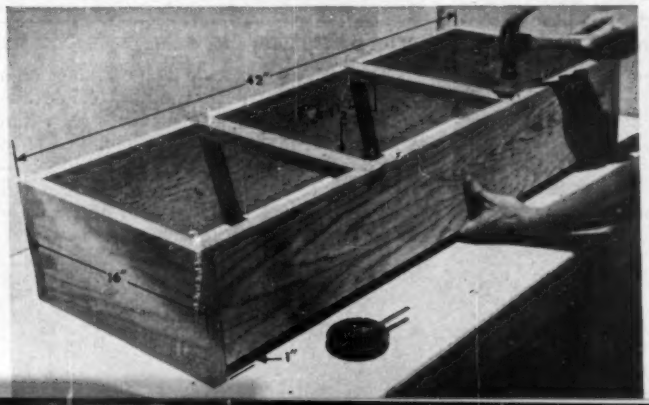
By Paul Corey

MY DAUGHTER wanted a place to do her homework in our living room. So I decided to build a wall desk as simple in design and as economical in cost and use of tools as possible. The photos show you how it looks, and it cost me only $3.80 and an afternoon's work.

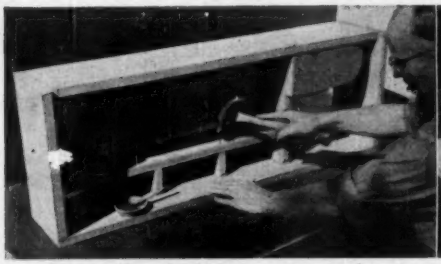
For lumber I bought four 1″ by 8″ undressed redwood boards 6′ long. Boards of this length were easy to bring home in the car. After smoothing the boards with plane and sandpaper—the hardest part of the whole job—they still were almost 1″ thick.

The standard 25/32″ thickness of mill-dressed lumber is all right for this desk. But I went to the extra work of dressing the stock myself because I like the looks of the heavier boards.

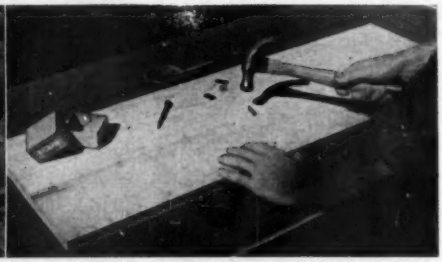
With more tools and time, you could put a desk like this together with more elaborate corner joints. But I decided on simple butt joints held together with nails and glue, and they have proved perfectly adequate for



Simple construction is shown here. Mounting strips on back of desk are placed where they match wall studs. One inch was ripped off bottom board to make room for the hinged front.



Put in partitions and compartments for stationery to suit yourself. Fasten them with nails and glue. Desk has no back, since the wall serves as a back when the desk is mounted.



Boards to make lid were cut 3" short to allow for stiffeners at each end (below). Corrugated fasteners and glue were used to hold boards together. Fasteners were countersunk.

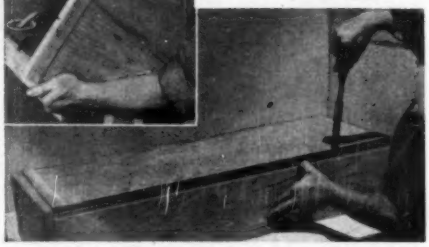
our purposes. A continuous or piano hinge fastens the desk lid to the desk bottom. (You may find it under either name.)

The desk lid is held shut with friction bullet catches—one 3" in from each end. A finger notch in the center makes for easy opening.

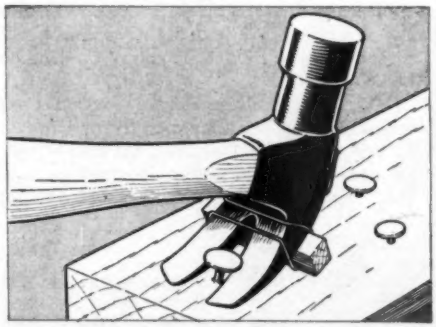
To support the desk lid firmly for writing, I added stay hinges at each end. These fold up out of sight inside the desk when the lid is closed.

After I finished the desk, I countersunk all nail heads and filled over them with composition wood that was tinted to match the redwood. Then I sanded all surfaces smooth. I gave my desk one coat of lacquer sealer inside and out and added a single coat of gloss lacquer. This finish dries in a short time and your job is done. Mount the desk with screws through the mounting strips and into the wall studs. END

To prevent lid from dishing and to strengthen it generally, 1" by 1½" stiffeners (left) were nailed and glued across each end of it. Finishing nails were used throughout.

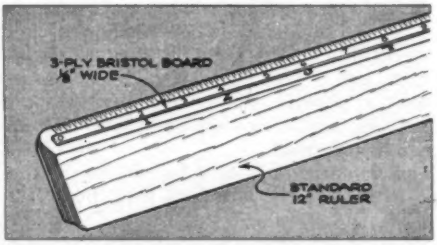


Piano hinge (also called a continuous hinge) joins desk lid to desk bottom. When open, lid is supported by a stay hinge at each end. Friction catches at each end hold lid closed.



Block Speeds Nail Pulling

WHEN you have a number of nails to pull, fasten a small block of wood to your hammer with a rubber band. The block will stay put and greatly speed up your work.—*Warren J. Wightman, Buffalo, N. Y.*



Marked Rule Shows Scale

AN EXTRA set of scale inch markings on a ruler makes it easier to produce scale drawings. Mark off the new divisions on a thin strip of Bristol board and attach the strip just below the regular ruler scale with rubber cement. The two-in-one ruler simplifies calculations and makes it easy to measure distances directly in the reduced scale.

What You Can Do About

A Damp Basement

The three common troubles—condensation, seepage, and leakage—can be cured, but each has its own remedy.

By George H. Waltz, Jr.

PS PHOTOS BY HUBERT LUCKETT

ARE your cellar walls all wet? If they are, these winter week ends are the best time to start a campaign to dry them up. They can be remedied in most cases.

Damp basement walls may be the result of condensation, seepage, or actual leakage. Each cause of trouble calls for a specific treatment.

Leakage is the easiest to spot. It is an actual flow of water through the walls caused by the head, or pressure, of water outside the foundation. It produces not just general dampness, but general wetness with actually visible trickles. But in some cases, leakage is noticeable only after a thaw or a heavy rain.

Use a Mirror

Condensation and seepage produce visible symptoms that are much alike—damp spots or an over-all dampness. So they are often hard to tell apart. If you aren't sure which is causing your basement dampness, borrow your wife's small pocketbook mirror and glue or cement it to a wet portion of the wall. Then, four or five hours later, examine its surface carefully. If it is fogged with tiny water droplets, *condensation* is keeping your basement walls damp. If its surface is as clear and dry as when you put it into place, *seepage* of natural earth moisture through defective and porous cement or building blocks is causing your trouble.

Condensation occurs most often during the warmer, more humid months, but may also show up in winter when warm, moist cellar air comes in contact with cold basement walls. It can be cured in various ways. Better circulation of the air in the cellar, provided by open cellar windows on dry days, or a basement exhaust fan, will help. So will an electric dehumidifier or

Damp basement walls can be the result of any combination of three common difficulties—and diagnosis of the trouble first is important.

Mirror cemented to wall will help you decide whether dampness is condensation or seepage.

large amounts of a chemical dryer such as calcium chloride. The important thing is to reduce the water content of the cellar air either by evaporation or by absorption. Chemical dryers can be obtained in either cakes or bags of powder that can be placed in various spots around the cellar. Naturally, any chemical dryer must be revived occasionally.

Sealing Up the Pores

Seepage, too, can be cured, but not so easily. Since it is caused by the oozing of natural moisture in the earth surrounding the foundation through porous wall construction, the remedy is to seal up the pores. This can be done by applying any one of a number of commercially available damp-proofers. Most of them are powdered cement-base preparations that you simply mix with water. If you pick the kinds that come in a variety of pastel colors, you can decorate your cellar walls at the same time.

Regardless of what damp-proofer you choose, the preparation of the wall surfaces is very important. Any sort of finish on them—such as calcimine or oil paint—must be removed. And all visible cracks or holes must be carefully patched with mortar after they have been enlarged and cleaned with a cold chisel and hammer and their sides have been undercut to form a dovetail that will hold the patch firmly in place.

In applying the damp-proofer, brush the material into the wall to fill every pore. Start at the bottom and gradually work up. Since this is a messy process, it's best to wear an old hat and goggles or glasses.

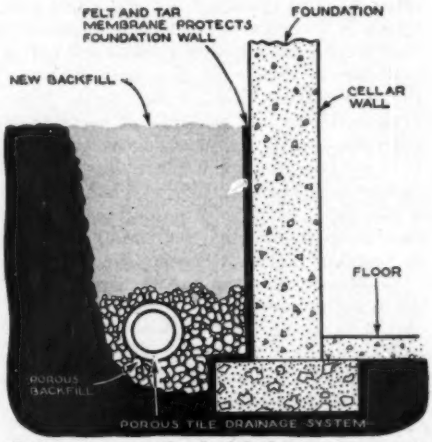
Two coats of most damp-proofers are needed. The walls should be thoroughly wetted down after the first coat has dried and before the second one is applied. The drying time, in most cases, varies from about two to four hours. Don't rush it. After the second coat has dried and won't brush off, the wall should be wetted down again and then again every twelve hours for the next three days. This continual wetting and drying helps to cure the mixture slowly and makes it an integral part of the wall.

If, after the second coat has been thoroughly cured and allowed to dry, you see moist spots here and there, some of the larger pores in the wall surface have not been completely filled. They should be enlarged with a cold chisel, filled with patching cement or a 1-to-2 mortar, and re-treated with the damp-proofing mixture.

Since all cement-base damp-proofers are quick-setting preparations, be sure to wash off all drippings and spatters that might mar your basement floor or other surfaces. If you let them stand too long and they harden, you'll have trouble removing them.

Grading May Stop Leaks

The most difficult wet basement wall to fix is one through which water is being forced by the pressure of accumulated water outside. If you can see water on the wall, not just dampness, leakage is your trouble. The root of the trouble can range all the way from such an easily corrected thing as a misdirected downspout, or a leaking gutter that floods the ground in contact with the foundation walls every



Only sure cure for bad leakage is to encase basement in a "membrane" of felt and tar.

Cement-Base Damp-proofer Will Usually Stop Seepage

Old finish must be removed first with wire brush, paint remover, or solvent made by dissolving 1 lb. of tri-sodium phosphate in 1 qt. of warm water. Holes and cracks must be cleaned out with a cold chisel, sides undercut to form a dovetail, and then filled with mortar (1 cement, 2 sand, water). If actual leak is visible, a quick-setting patching cement must be used. After patches set, wet wall down with fine spray from hose. Finally, mix damp-proofer according to manufacturer's directions and scrub into wall with a stiff-bristled brush. Most damp-proofers require two coats.

Remove old finish before damp-proofing.

Clean out holes with cold chisel.

Fill holes solidly with a 1-to-2 mortar mix.

Wet wall down with spray from garden hose.

Scrub damp-proofing into wall with stiff brush.

time it rains, to a high ground-water level that keeps your cellar walls continually surrounded with water. Regrading the land that surrounds a house, to provide a better run-off, may solve your problem. And sometimes replacing a porous backfill that originally was placed against the foundation wall with less porous earth will do the trick.

But the only sure cure for really stubborn leaks is a "membrane" that seals the outside of the foundation. This entails digging a trench completely around the house to expose the foundation and then applying alternate layers of felt and hot tar to form a waterproof protective coating. In extreme cases, this watertight envelope can be augmented by special drains—a network of porous tile placed at the bottom of the ditch and arranged to carry the water to lower ground or a sump.

But don't jump to conclusions if you are plagued by a damp cellar. Remember it may be caused by any one of a number of things—or a combination. END

Would a dry well solve your drainage problems? See* POPULAR SCIENCE *next month.

Sanding Stock to Thickness on Your Lathe

CRAFTSMEN and modelmakers often need a piece of wood of an in-between, non-standard thickness. To work it down by hand is slow and inaccurate. Here's a thickness sander that works fast, to close tolerances, and will handle good-sized pieces.

You can make the sanding drum, if you haven't one already, by turning a 2" by 2" by 8" piece of hardwood to a cylinder of uniform diameter. Saw a ⅛" by ¼" slot lengthwise, tuck the ends of the paper into this, and wedge them with a strip of wood.

Making the Planer

Use ¾" hardwood for all the planer parts except the adjusting-screw bracket. Because of its shape and the resulting short grain, this is best made of plywood. Select a perfectly flat, true piece for the table, as this will determine the accuracy of the work the planer will do. Make the table support high enough to bring the table, when level, about ⅛" below the drum. The bracket should be 1" lower than the table support. This will give you a thickness range of ⅜" to 1".

The height-adjusting screw is made by running a wing nut tight against the head of a 3/16" bolt. Drill an undersized hole through the bracket and turn the bolt into it to cut its own threads. Insert a wing bolt at right angles to lock the screw.

Thread three leveling screws into the base, locating these so that they can be reached with the table in place. They provide tilt adjustment to bring the table parallel to the drum.

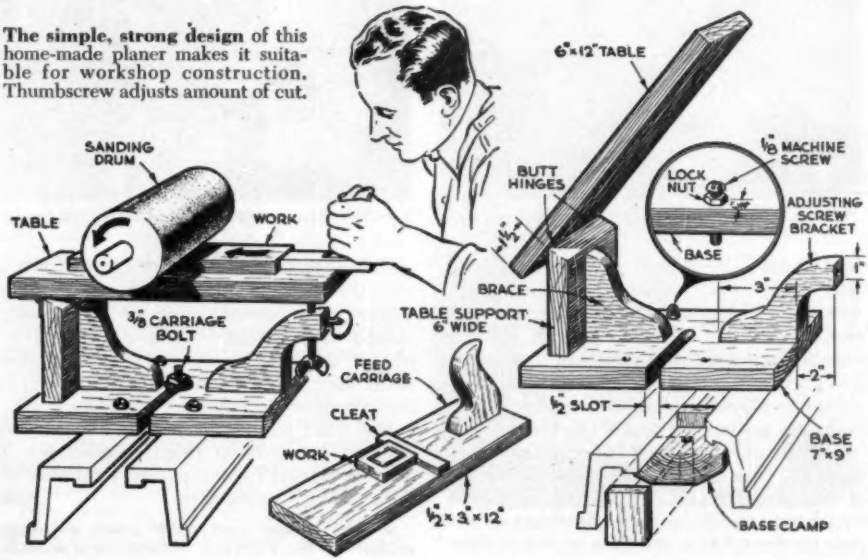
A base clamp for mounting the planer on the lathe can be built as shown below. Cheek pieces center the clamp block between the ways. You may be able to use your tool-rest clamp instead of making one.

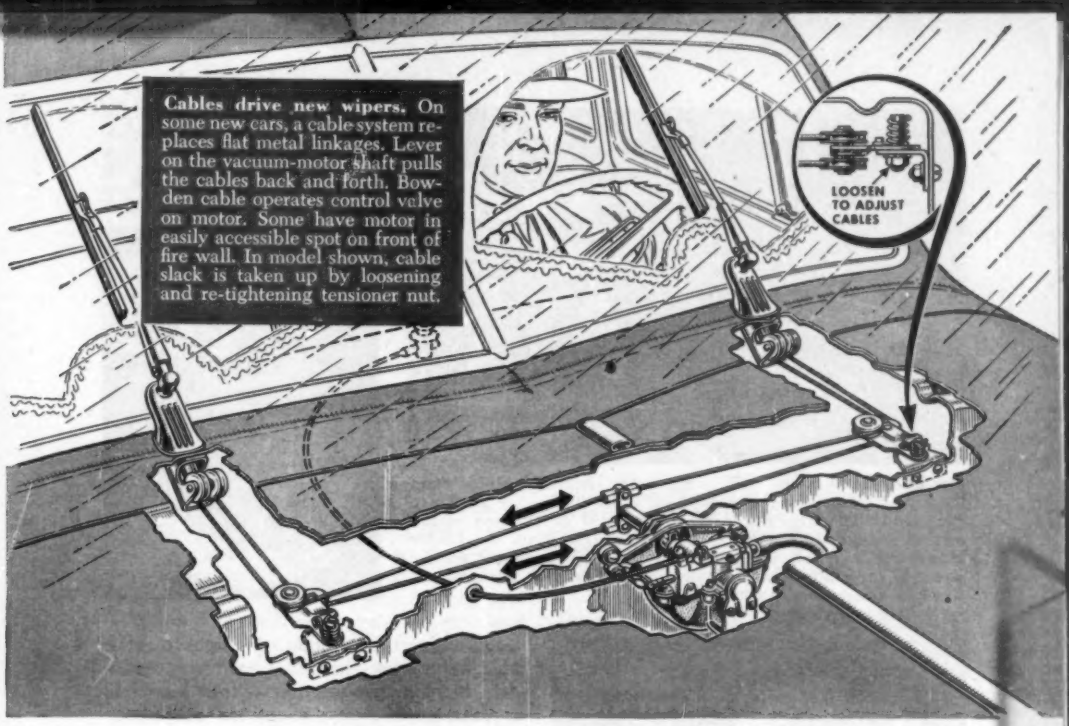
How To Use It

Open-coated, fairly coarse garnet or aluminum oxide paper, run at medium to high speed, usually works best. Fine papers tend to clog up. Be sure to feed work *against* rotation of the drum. Run the lathe backward or, if your motor doesn't reverse, feed stock in *from the back*. Adjust the table to take a light cut at each pass.

To check adjustment, run a wide piece through and measure it at both edges with calipers. If thicknesses aren't equal, adjust the leveling screws. A simple feed carriage, made as in the drawings, is handy for small pieces.—*Roy Rogers, Brooklyn, N. Y.*

The simple, strong design of this home-made planer makes it suitable for workshop construction. Thumbscrew adjusts amount of cut.





Cables drive new wipers. On some new cars, a cable system replaces flat metal linkages. Lever on the vacuum-motor shaft pulls the cables back and forth. Bowden cable operates control valve on motor. Some have motor in easily accessible spot on front of fire wall. In model shown, cable slack is taken up by loosening and re-tightening tensioner nut.

How to Pep Up Your Wipers

If your wiper is dragging its feet, it probably needs one of these treatments.

By R. P. Stevenson

PS PHOTOS BY HUBERT LUCKETT

LIKE grandpop, vacuum windshield wipers may slow down with age. Very often the change comes so gradually that you do not notice it.

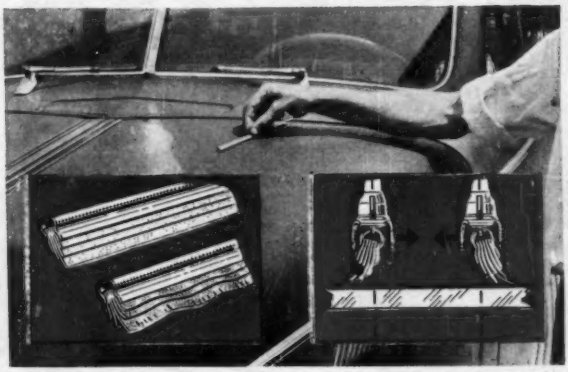
But it is often easy to check your wipers and bring them up to snuff. Anyone can usually spot the trouble—and perhaps take care of it—without calling in a high-priced mechanic.

In most cars all the vacuum that powers the wipers comes from the intake manifold, but in some a vacuum pump on the fuel pump lends a helping hand when manifold vacuum drops. A hole or poor joint in the connecting lines will divert the vacuum (suction) and slow down or stop the blades. An inoperative vacuum pump will leave the blades idle just when you need them most.

Checking the vacuum line. The hose may look good but be imperfect. To check, remove it from the car and hold your thumb firmly over one end while you blow smoke into the other. Escaping smoke will show up any holes.

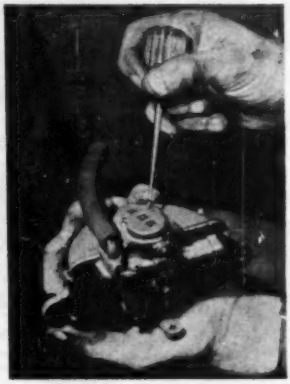
Make sure, too, smoke passes through the

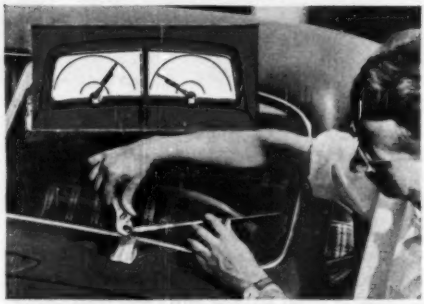
What's their speed? On dry glass, your wipers should make at least 100 sweeps each minute. Count the strokes (from one side to the other) with the engine idling and the wiper control turned to full speed. If you find yours below par, this article may help you speed them up.



Are the blades good? Unless the rubber is flexible, they won't wipe well. Test this by pressing on a flat surface, as shown in the photo. The edge also must be straight. If it's wavy or the rubber is hard, buy new blades. When operating, the blades should tilt from side to side and be pulled, not pushed, by the arms. If the blades don't tilt and you can't adjust, replacement wiper arms are usually your best bet.

Is breather hole clogged? See how dirty the motor below was when it was taken from car. Vacuum motor must have air to operate right. Clean out breather hole with sharp tool.





Is the stroke even? One blade sometimes lags behind the other as shown in sketch (above). To correct this, remove the arms, start the wiper motor, and let it stop with the shafts in parked position. Then put back the arms in parked position. On some older cars the arms are tightened by turning a lock nut as shown in the photo. The majority, however, slip on or off shaft when bent at the hinge.

Does the hose leak? If there's a hole in the hose, your wipers won't get full vacuum. You can test it for leaks by blocking one end and blowing cigarette smoke into the other.

hose without restriction. A wiper can be knocked out by a hose that has collapsed inside, blocking the vacuum, without any sign of deterioration on the outside. In putting back the tubing, be careful that it forms a tight seal over the connecting tubing.

Vacuum hose is most likely to go bad at the intake-manifold end, where it is most subject to engine heat. You can sometimes cut off a defective end and put the old hose back. But it usually pays to install new hose if you find the old one leaking, plugged, kinked, oil soaked, or otherwise defective. It's also a good idea to unscrew the intake-manifold fitting and scrape out its inner end. Deposits there may narrow down the passage and reduce vacuum action.

Testing a vacuum pump. On cars equipped with a vacuum pump, the wipers should work at nearly constant speed regardless of engine speed or load.

To test the pump, disconnect the outlet line (the one that leads to the intake manifold), turn on the wiper control, and slowly accelerate the engine. If the pump is in good shape, the wipers will begin working at about 15-m.p.h. engine speed and reach maximum speed at about 40 m.p.h.

If the wipers fail to work when you make this test, check the vacuum lines and the vacuum motor before condemning the pump. This can be done by detaching the windshield-wiper line at the pump and connecting it to the already detached outlet pipe with rubber hose. If the lines and vac-

uum motor are okay, the wipers will work at full speed as you speed the engine up.

What about the motor? If your wipers fail completely, check over the vacuum lines first. As a double check, remove the line at the vacuum motor and run the engine with your thumb blocking the line. If you feel a steady suction, the vacuum is probably okay, and this suggests that the motor is defective.

To rule out any possibility of binding linkage, disconnect the two connecting arms at the motor-drive lever. (On cable-operated units, disconnect the cables from the swivel connectors.) Then start the engine and try to operate the vacuum motor. If there's a mechanical push-pull link between the control button and the motor, be sure this is turning on the control valve properly.

If the vacuum motor fails to start, your best bet generally is to trade it in. Vacuum motors *can* be repaired, but it's a tricky job.

On one face of a vacuum motor you'll find a hole that allows air to enter as the mechanism operates. Dirt or lint clogging the hole will slow the wiper action.

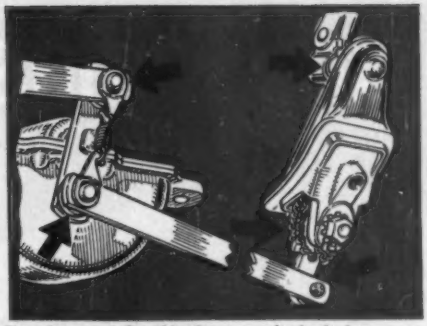
Oil the linkages. All moving joints in the wiper system should be lubricated occasionally. Squirt a little light penetrating oil into the felt washers that separate the parts. Remove the wiper arms and shoot some around each shaft.

On late cars the arms are removed or replaced by flexing them at the hinge. This retracts a slide lock and permits the serrated arm head to slide off or on the driving burr on the shaft. On some earlier snap-on types, a separate wire-lock hooks over the back of the driving burr.

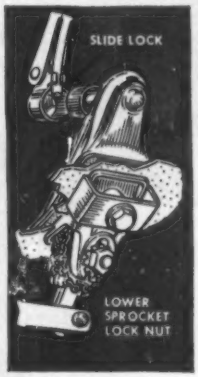
With the connecting arms disconnected from the motor-drive lever, work each side by hand to be sure everything moves freely. If they bind, oil may help. Or you may find that the linkage rubs against other parts under the instrument panel. Clear these away.

The motor should be securely attached and centered on the mounting bracket so the drive lever doesn't bind the linkage. Sometimes unequal blade strokes can be cured by shifting the motor slightly.

Are drive chains loose? You can find out by parking the wipers and removing the blades. Lift the arm just off the glass and move it up and down by hand. If the end of the arm moves more than 1½ inches, without forcing, tighten the chain as described in an accompanying sketch. Be sure to tighten the nut that holds the transmission housing. If loose, the casting will rock.



Do they need oil? Squirt a little light penetrating oil on the points indicated to eliminate squeaks and improve the speed. If wipers are cable-operated, apply light oil to pulley bearings each time the car is lubricated. Also smear light grease on the cables at the points where they run back and forth through pulleys.



Are drive chains loose? If you find they are, loosen lower sprocket lock nut, pull down the lower sprocket, hold it firm, and tighten nut. To do this, you may have to remove the unit from car. Tighten unit well when you put it back.

On cars with cable-operated wipers, the cables sometimes require adjustment. You may find, however, that yours have a spring and ratchet that automatically take up slack.

It is important that the cables run true on the tensioner pulleys. If they don't, bend the tensioner assemblies either up or down. But never operate the wipers by hand, for this could damage the cable connections. END

Cover Your Pipe for Safety

COVER your pipe when smoking outdoors or while driving to prevent a burned-out bowl and dangerous flying sparks. This simple, windproof cover, made from the top of a 35-mm. metal film case, will fit snugly over many pipes. If the fit isn't snug, crimp the edge of the cover with pliers.

Gus Tames a Runaway

Engine

First it wouldn't stop, then it wouldn't go, and the contrary engine had to get Gus's friend home by New Year's.

By Martin Bunn

ABOUT ten months ago, one of the big electrical companies put up a branch plant and laboratory just outside of our town. Part of that industrial decentralization program I've been hearing about, I guess. Anyhow, it brought quite an influx of new people into our community—most of them engineers and scientists.

One is a young fellow by the name of Jim Harrison. Jim, a veteran and unmarried, comes from Indiana, where not too long ago he graduated from engineering school, thanks to the G.I. Bill. Right now he's staying at Mrs. Paley's boarding house.

Everyone who knows Jim likes him, especially Gus Wilson whose Model Garage is one of Jim's favorite stopping-off places. Not long ago, Gus had helped Jim do a first-rate job of grinding his valves. Then back last summer, when Jim had just bought his secondhand car, Gus had shown him how to re-time the motor, adjust the carburetor and hook up a water injector, put in a new exhaust pipe and muffler, and replace a cracked windshield. Under Gus's direction, Jim had worked over the old car until he had practically rebuilt it.

Jim Calls for Help

Gus hadn't seen Jim for several weeks when one night recently Gus was strolling down our main street doing a little window shopping. Suddenly he heard someone shouting his name. It was Jim and he was running across the street toward Gus.

"Gosh, am I glad to find you," Jim gasped. "Been looking all over town for you. Can you spare some time? I'm in a spot, and you can help out."

"Sure thing, Jim," Gus said. "But let's stop off here at Dan's Grille for a coffee."

"Now, what's it all about?" Gus asked after they'd settled down on their stools and Dan had served up two steaming cups.

"Well," Jim began hesitatingly. "You may remember that I'd been hoping to take my two weeks vacation and drive along home

Gus aimed the flashlight into the carburetor's throat. "Even a carburetor can develop tonsils."

to see my Mother and Dad at New Year's."

Gus nodded.

"I'd planned to start out tomorrow night right after work," he went on, "but I guess that's all off now."

"What's the matter?" Gus inquired. "Work at the plant too heavy and they've asked you to put off your vacation?"

"No, it's not that," Jim replied glumly. "I can still have my vacation. It's my car. Something's gone screwy with it and I'm blamed if I can spot it. It started acting up last night on my way back to town from the plant. I was breezing along the outer road at about forty and took my foot off the gas to slow down for an intersection. Instead of slowing down, the fool car just took the bit in her teeth and never slackened. Before I could throw out the clutch, I was through the intersection. Then all of sudden the engine began to spit and sputter and finally died."

First She Quits and Then She Clicks

"Would it start again?" put in Gus.

"Not right away," Jim replied. "So I got out and lifted the hood to take a look. As I started to poke my head in under the hood, I heard a distinct metallic click."

"A metallic click?" questioned Gus.

"Yeah, you know, like something snapping back into place," explained Jim. "I couldn't find anything that looked wrong, so I decided to try the starter again. She kicked right off."

"Did the motor run evenly?" Gus asked.

"Never ran smoother," Jim pointed out, "but about a half mile further down the road she took the bit in her teeth again and continued to roll along at forty, accelerator or no accelerator. Then, just like the first time, she gasped and died. She did that about four times before I got into town."

"Sounds like something's binding somewhere in your throttle linkage," Gus offered. "Probably sticks when you've pushed the gas pedal down far enough to hit forty, stays there for awhile, and then pops loose."

"That was my first guess, too," Jim confessed, "but no luck. Besides, that wouldn't account for the dying act."

"No, you're right, it probably wouldn't," admitted Gus. "How did she act today?"

"Same business all over again," Jim grumbled. "Took me an hour to get to the plant."

"Where's the car now?"

The Patient Gets a Home Visit

"Out in the garage in back of Mrs. Paley's," Jim said eagerly. "Will you come over and take a look at it?"

Ten minutes later, they were in Mrs. Paley's garage and Gus, hat on back of head, was peering down at Jim's balky motor.

"The throttle linkage seems okay, just as you said," Gus muttered as he moved the throttle rod back and forth. "Doesn't bind at all. Have you looked to see if there's dirt or anything that might be jamming the throttle valve?"

But before Jim could answer, Gus had lifted off the air cleaner and was peering down into the carburetor's throat.

"Looks clean," Gus announced. "Let's take a little spin and see if she'll do a repeat performance for me. Got a flashlight?"

"She'll repeat all right. I'll guarantee that," Jim grumbled as he slid in behind the wheel, pulled a flashlight from the glove compartment, and handed it to Gus who had climbed in beside him. "I'll bet we don't get a quarter mile out on the state road before old Nellie here runs away and then dies gasping for breath."

There's Life in the Old Girl Yet

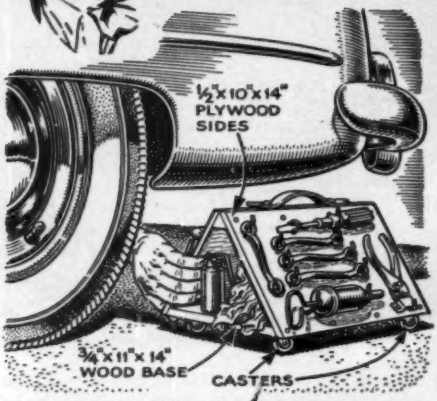
Gus noticed that the car started easily enough, and, as Jim weaved his way through town, he marveled at how well the car ran in spite of its age.

Things happened just about as Jim had predicted they would. They'd no sooner hit the state road and gotten the car up to forty when, at a nudge from Jim, Gus looked down at the floor boards. Jim's foot wasn't on the accelerator, yet the car was rolling along at about forty-two miles an hour.

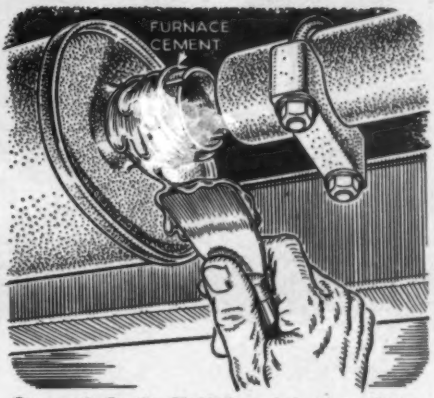
"Automatic pilot," Jim said with a chuckle, but his laugh was interrupted by sputterings

[*Continued on page 234*]

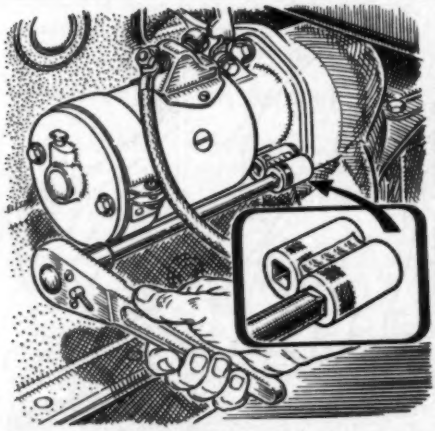
Hints from the Model Garage



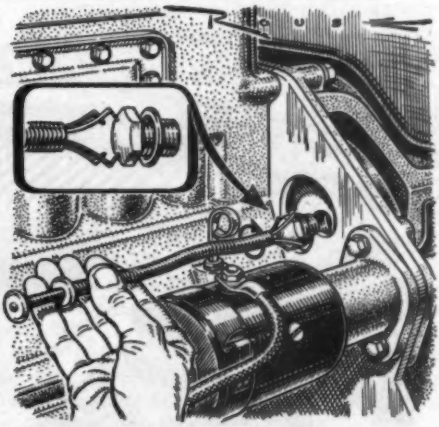
Tool Dolly a Big Help. A mechanic lying on a creeper can keep his tools handy with a low dolly like this. Use the triangular space inside for rags, pump oilers, and the like. The dimensions shown make a dolly of a convenient size.



Cement Seals Tailpipe Joint. In fitting a tailpipe to a muffler, you can get a better seal by applying a little furnace cement before slipping the units together. A 20-cent can of cement is enough for a dozen or more such jobs.



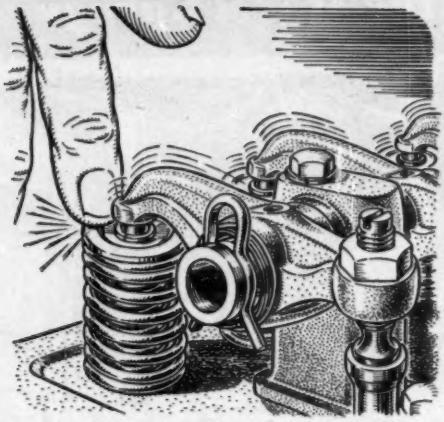
Offset Socket Turns Nut. In loosening or tightening starter bolts on some cars, you can't use a socket wrench because there's no room for the handle. For such jobs, Marion L. Rhodes, Knightstown, Ind., welded two sockets together side by side. With these and an extension rod, he can take a half turn at a time.



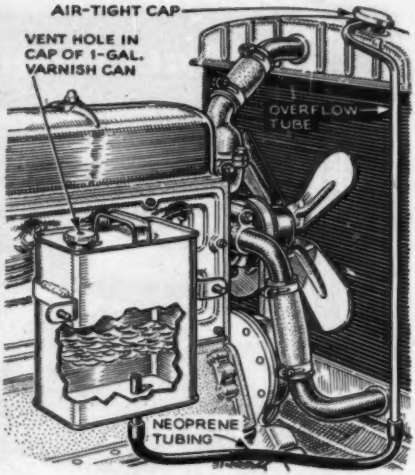
Grabbing Tool Saves Plug. If you've ever filled a Hudson wet clutch, you know how easy it is to drop the plug inside the housing—and how difficult it is to get out. Some mechanics stuff in a rag to catch it, but here's a better way: Buy a flexible grabbing tool like the one shown and use it for this job.

Turn the page, please, for four more auto hints.

MORE Hints from the Model Garage



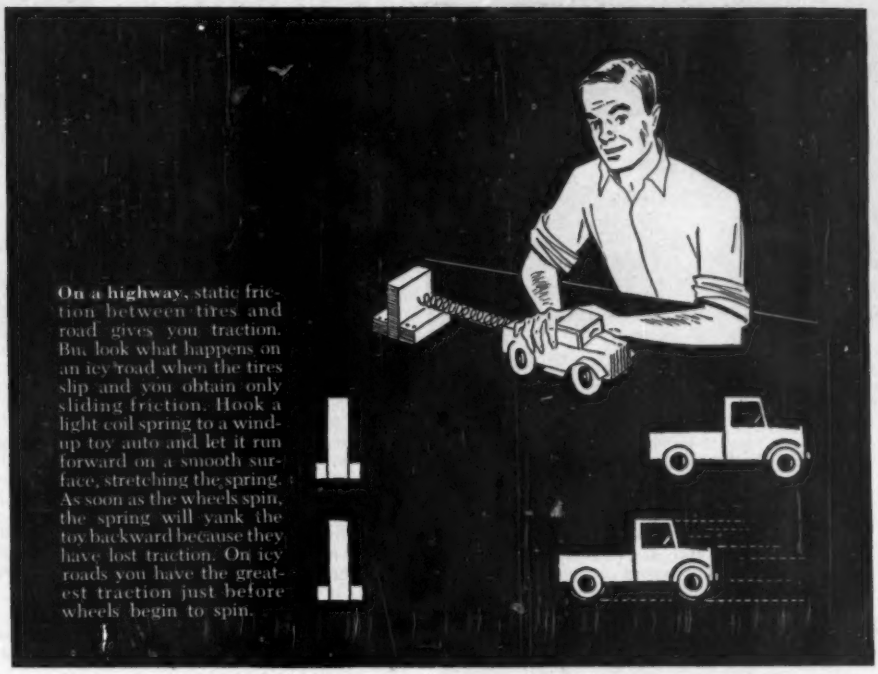
Finding a Noisy Lifter. A noisy hydraulic valve lifter can be located by removing the rocker-arm cover and resting a finger on each valve-spring cap in succession while the engine is idling. If any lifter isn't working properly, you'll feel a distinct shock in your fingertip when the valve returns to its seat.



Save Your Antifreeze. In cars with atmospheric cooling systems, you can lose alcohol antifreeze through the overflow pipe when the engine runs hot. A tank like this will save it. Boiled-out alcohol will condense in the can. When the engine cools, vapor in the radiator will condense, sucking alcohol back from the can.

Clip Will Hold Notes. An ordinary spring clip mounted like this makes it easy to keep notes in sight while driving. Remove one of the screws from the windshield molding, slip it through the eye of the clip, and replace in the molding.

Cement Saves Seat Covers. If seat covers are about to wear through, apply a thin coat of Duco cement on and around the worn area. D. Earl Chase, of Long Beach, Calif., says he has extended the life of covers a year or more by this trick.



What it does is easy to demonstrate, but even the experts don't know exactly what produces it.

By Kenneth M. Swezey

CHANCES are you think of friction in your car as something to be gotten rid of. Yet without friction, your car couldn't start, keep going, or stop!

In the moving parts of your engine and transmission, friction is a costly trouble-maker that must be reduced through lubrication. But brakes, clutch, and the moving and maneuvering of your car over the road all depend upon friction.

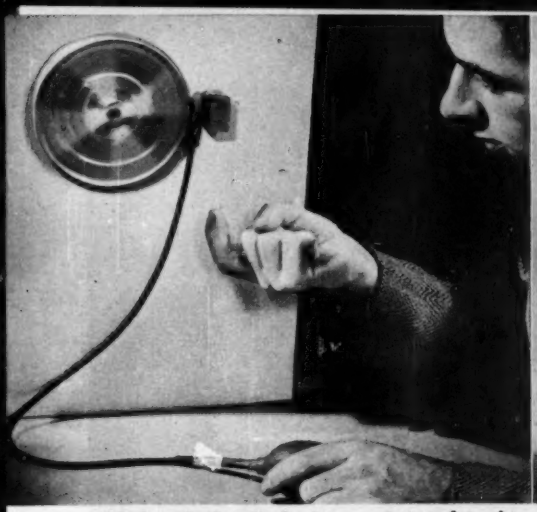
Much still remains to be learned, the scientists say, about what causes friction. It has been ascribed to the intermeshing of surface irregularities, the action of molecular forces, harder projections plowing through softer ones, and electrostatic forces. Many experts believe now that all four factors are involved, but think that molecular forces play the major role by causing adhesion or cohesion of the surfaces.

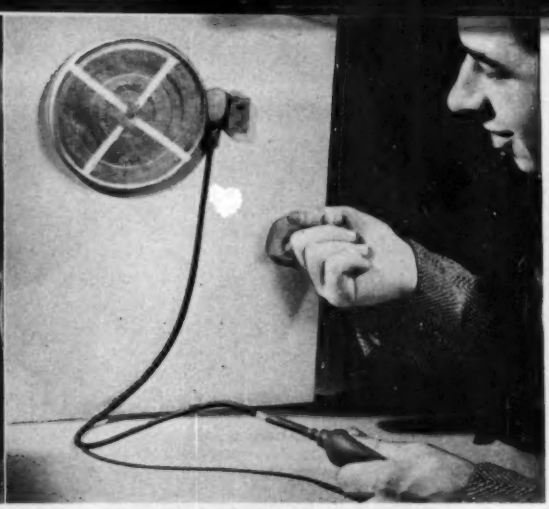
Despite the uncertainty as to the reasons for friction, the way in which it helps your car stop and go, and how it makes smoother, safer driving possible when properly controlled can be shown convincingly with stunts you can perform at home.

Rough surfaces usually produce more friction than smooth; solid surfaces more friction than liquid. Tack a piece of coarse cloth on one side of a board about 8″ wide and 18″ long, and a piece of smooth cardboard on the other. Place a flatiron near one end of the board, and raise that end slowly until the iron begins to slide. You can raise the board higher when the iron is on the side covered by rough cloth than when it is on the smooth side.

Now turn over the board, smear the cardboard surface with cooking oil, and try your test again. This time the iron quickly starts sliding down the board.

Manufacturers use this principle in adding or reducing friction in your car. Where high friction is needed, as in brake linings, clutch facings, and fan belts, rough materials such as asbestos, cotton, rubber, and plastics are used. Cylinders, pistons, shafts, and bearings, on the other hand, are polished to mirror smoothness, and lubricated with oil. Properly lubricated surfaces do not actually





Modern hydraulic brakes are imitated in this setup. A small balloon (to represent a brake cylinder and friction surface combined) is tied to one end of a thin rubber tube, and an atomizer bulb (to represent the master cylinder) to the other. The balloon is then fastened to a board so that it fits loosely between a small block of wood and a coffee-can cover (the brake drum). The cover is mounted at its center so it can spin freely. If you now spin the cover without pressing the bulb, the limp balloon will not interfere. Press the bulb, however, and the balloon inflates, presses against the cover and quickly stops it. If liquid were in the bulb, balloon and tube, as in the hydraulic system of your car, the transmitted force would be still more powerful, since liquids don't compress the way air does.

touch solidly but slide on a thin film of oil.

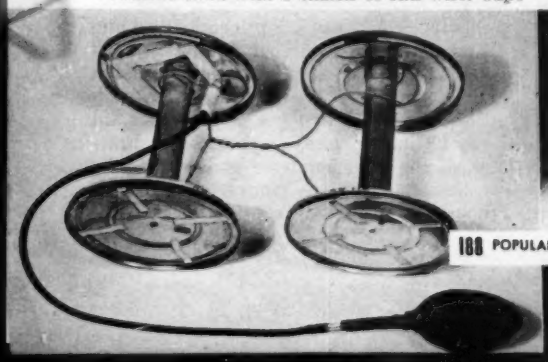
There is a second principle of friction that every car driver should know: that *friction is greater when surfaces are motionless in relation to each other* (static friction) *than after they start to slide* (sliding friction).

To demonstrate this, try dragging your flatiron over a smooth, firm surface by means of a spring scale. Begin with the iron at rest, and pull steadily. Read on the scale how hard you have to pull before it stirs. Then pull the iron along at an even rate and see how much less force is needed. That's because in the first case you're pulling against static friction; in the second, only against sliding friction.

When you start your car on an icy road, you get the greatest pull from the wheels when held by static friction, just before they start to spin. You can minimize spin by using high or second gear, rather than low, and by gentling the gas pedal.

In your brakes, powerful friction is applied by liquid pressure remotely controlled. Pressure on the brake pedal causes liquid pressure to develop in a master cylinder. Through tubing, the pressure of the liquid is transmitted equally to smaller cylinders in the brake mechanisms of each of the four wheels. These small cylinders cause friction linings to bear firmly against drums or disks fastened to the wheels, slowing the car.

Best way to use your brakes can be demonstrated by making a crude car like this. Nail coffee-can covers firmly to the ends of two 6" lengths of broomstick or shade roller, and connect them with a chassis of stiff wire. Tape the balloon end of the "brake" used in the setup at top of page to the wire so that the balloon when inflated will press against one of the rear wheels. Adhesive tape on the inner side of this wheel will increase the friction.



Whether a car rolls or skids to a stop is another problem of static versus sliding friction. As long as the brakes can slide on the drums, the wheels will keep a firm grip on the road; if the brakes should lock, the wheels must slide. To stop your car in the shortest possible distance without skidding, you must apply the brakes until they are just short of locking. In that situation, brakes exert their maximum retarding force.

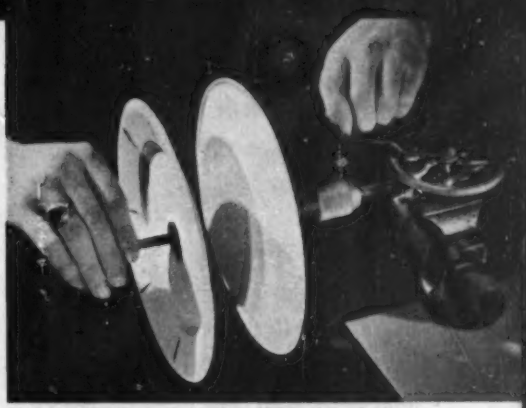
Your clutch also depends upon friction, either solid friction as in the conventional clutch, or fluid friction plus inertia as used in the fluid variety.

Even Fluid Clutch Uses Friction

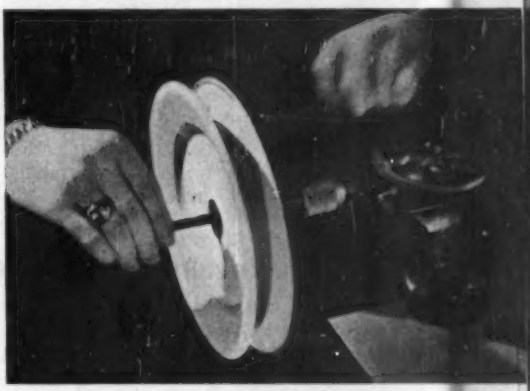
The fluid clutch depends in part upon the friction of a fluid, whirled by an impeller wheel, upon a similar wheel that faces it. With two electric fans, set face to face, you can get an idea of how it works. Only one fan (the impeller) is plugged in. Set this going at slow speed (engine idling) and the friction on the other is not enough to turn it. Turn the impeller to high, and the second fan builds up speed smoothly until it is running almost as fast as the first.

What becomes of the energy absorbed by friction? It is changed to heat. You can easily prove it. Tightly plug the lower end of a ⅜" brass tube 3" long, and grip it in the chuck of an electric drill or flexible shaft, mounted vertically. Partly fill the tube with water and cork the upper end. Now set it spinning between the jaws of two stationary spring clothespins clamped on it. Within several minutes the heat of friction will boil down the water and pop out the cork!

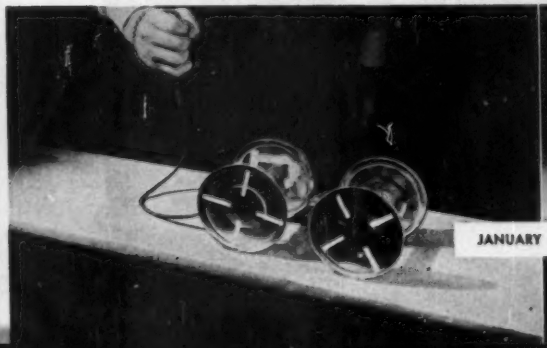
In the normal operation of your car the heat of friction is dissipated as fast as it is created. If you "ride the clutch," or use the brakes continuously, however, this heat may burn out the clutch or brakes. END



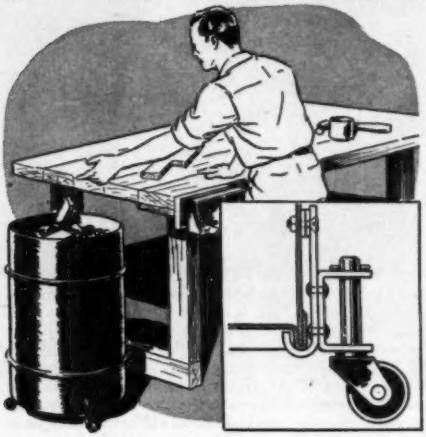
Principle of common clutch involves friction, too. Attach round pencils by means of sealing wax to the center of each of two paper plates. Rotate one plate with a hand drill while holding the other parallel to it but not touching, above. The rotating plate represents the engine flywheel, the other plate the clutch connected to the transmission. When you press on the clutch pedal in a car, the plates are separated, permitting the engine to run without engaging the transmission. Bring the plates gradually together, however, the way they do when you let up the clutch pedal, and friction between the plates causes the second plate to start turning and gain speed until it is revolving at the same speed as the first one, below.



Roll the car down a smooth inclined plank and you'll find that you can make it roll as slowly as you wish, or stop smoothly, by controlling the pressure on the bulb in your hand. Let the car gain speed, and then apply pressure strongly and suddenly, however, and what happens? The rear wheels lock and the car skids out of control down the road. Locking wheels not only lessens effective stopping friction but also causes loss of directional control.



This Waste Bin Rolls Freely Around Your Shop



An old oil drum makes an ideal waste container if casters are attached to allow it to be rolled about. Insert each caster in a bracket of 3/16″ by 1″ strap iron, riveted to a leg bent to hook under the drum. A single screw or rivet will hold each wheel assembly on the drum.—*Jesse R. Lucas, Michigan City, Ind.*

You Don't Have to Lick 'Em

An empty spot-cleaner bottle with applicator top makes an excellent envelope sealer when refilled with water. It's handy for children to use, too, in playing with mucilage-backed cut-outs.—*Jensen Malley, Rutherford, N. J.*

Brighten the TV Tuning Knob

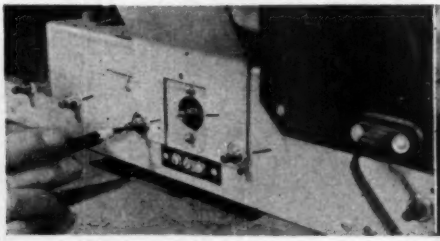
Indicator knobs on TV sets often have white dots or lines by which they can be indexed on the channel-selector dial. If the dot or line on your set becomes indistinct, you can sharpen it up and make it more visible in dim light with a little white touch-up paint. Apply it with a brush, pen, or orange stick.—*H. Leeper, Canton, Ohio.*

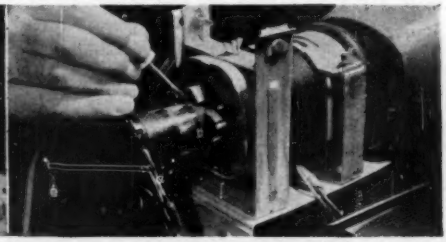
Homemade Brush Does Painting Jobs

For small touch-up painting jobs, you can quickly make a disposable brush. Fold a small piece of cloth lengthwise several times and attach it to a stick of wood with a string or rubber band. —*Louis Hochman, Sherman Oaks, Calif.*

Marks Make Readjusting a TV Receiver Less Risky

Vibration, age, and other factors may whittle away the quality of your TV picture. In many cases, however, you can restore top performance by careful readjustment of the back-of-the-set controls. Changing their setting, however, may also throw a receiver completely out of adjustment. If you'd like to try sharpening your reception but are afraid of the consequences of a bad job, mark the position of each control before you start. You can then be sure of being able to restore it to its original position if the new setting doesn't help. Pencil an index line on the control shaft and a corresponding line on the chassis. To locate the ion-trap magnet, use nail polish or a grease pencil.



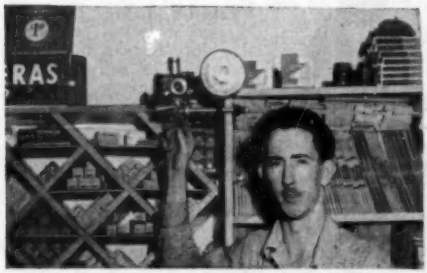


CRAFTSMEN AT WORK

Model Tugboat Is Radio-Controlled. James Emel, skipper of an Army tug at Seattle, Wash., holds a model he and his brother, Jack, built. Scale is ¾″ to 1′. The 48″ model tug weighs 50 lb., does 4½ knots, and is driven by a 6-volt, battery-powered motor. A radio receiver in the wheelhouse picks up impulses from a hand-carried transmitter to control the model. A motorcycle battery runs the boat for about 1½ hours.

Builds a 2,400-Lb. Locomotive. Donald Benoit, a Norwood, R. I., machinist, built this oversized model of an old 4-2-2 locomotive. He spent about 6,000 hours over a 4½-year period working on the engine. The boiler builds up 100 lb. of steam. Benoit says the engine could go 40 m.p.h. if there were enough straight track. He has one third of a mile of track at Hamilton, R. I.

Camera Stops Rental Thefts. The photo below shows you what the customer sees when he rents equipment from Lyn Grover, Glendale, Calif., photo dealer. Each rental customer is photographed by a 35-mm. camera. A foot switch controls the 150-watt light. A cable release snaps the picture and an automatic transport moves the film for the next exposure. Grover says he has not lost equipment since he began "mugging" borrowers.

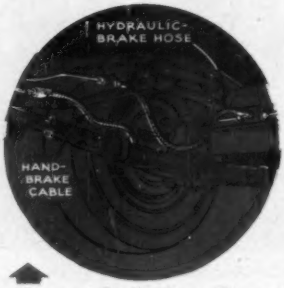


7½-Hp. Motor Runs Cruiser 9 M.P.H. William C. Miller, Jr., of Oceanside, N. Y., who built this 17′, 6′2½″-beam cabin cruiser from PS plans, also made the quadrant to permit remote steering from a wheel in the cabin. The quadrant clamps to the carrying handle of the outboard motor by two wing nuts. Throttle and shift controls also are at the wheel. The builder says that the boat cruises from 7 to 9 m.p.h. He has seen seven other boats built from the same plans.

While Your Car Is on the Grease Rack

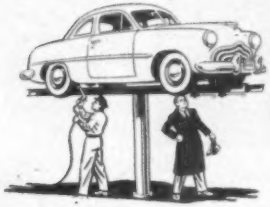
GIVE it a worm's-eye checkup. The best mechanic can easily miss trouble coming. You may find it if you always use your few minutes of waiting time for under-car inspection. It's a practice that not only may save you money but also may save you from a serious accident.

Check the steering gear for dangerous looseness by vigorously shaking all parts. Test the tie-rod ends with extra care. Grasp wheel at bottom and shake to see if king pins are worn. Be sure all cotter pins and locknuts are okay—and that no parts are cracked or bent.



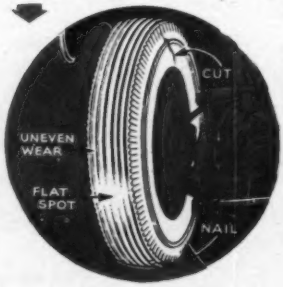
Inspect the brakes. Examine the hose and fittings at the ends. Check master cylinder if visible. Make sure handbrake cable is secure. Look for oil dripping from lower edge of brake drums—sign of a defective oil seal.

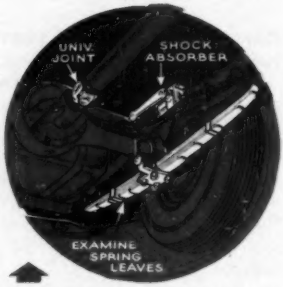
Look for leaks that waste gas and oil. Oil may drip from edge of pan or out hole in bottom of clutch housing. Test transmission and differential plugs for looseness. Slip a screwdriver into the vent pipe. It sometimes gets clogged. Also check engine mounts.



Check exhaust system. See that muffler and pipes are mounted securely. Examine muffler for rust holes and explosion ruptures. Slap it sharply to see whether the baffles have worked loose. Be sure tailpipe isn't bent or badly flattened. This can cause serious loss of power.

Go over the tires. You won't have a better opportunity to locate embedded nails or tacks, cuts, and the uneven wear that comes from improper wheel alignment. Wipe off any grease or oil you find on tires.





Examine springs for signs of broken leaves or failing shackles. Inspect the shock absorbers for worn linkages and fluid leakage. Shaking propeller shaft may reveal loose universal joints. Be thorough; the inspection affects both your pocketbook and your safety.

A Well-Strained Diet Saves a Car's Engine

You must clean the cleaners regularly if you want them to keep out dirt. Here are tips on how to go about it.

By R. P. Stevenson

YOUR car's engine will give you more economical service and last much longer if you make sure abrasive grit and dust particles are strained from the air, oil, and fuel on which it feeds.

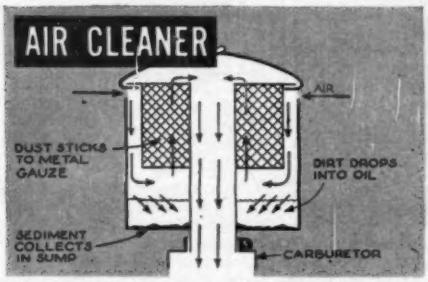
Air cleaners, oil filters, and gasoline strainers are installed to do this. But they must be cleaned regularly to do it well.

An engine usually has at least two air cleaners. One filters the air sucked into the carburetor. A second (and sometimes a third) keeps dust out of the crankcase. Under ordinary conditions, washing and oiling these cleaners each time you change oil is sufficient. But in extremely dusty regions, it pays to give all of them much more frequent attention.

An oil filter is not always standard equipment, but increased engine protection warrants the extra cost. Your money will be wasted, however, if you delay changing the filter cartridge, letting dirt clog it up. In some new cars, by-pass filters are giving way to the more efficient full-flow type.

Because some deposits are insoluble in kerosene or gasoline, garages often use special solvents for washing air and fuel filters. But if you want to do the job at home, kerosene or gasoline will usually produce good results.

The photos below and on the next two pages show you how.



Why it needs cleaning. Air drawn through an oil-bath cleaner (above) suddenly reverses direction, causing heavy dust to fall into bath. Lighter particles may continue—but the oily gauze stops them. A "dry" type cleaner has no oil sump; gauze then does all the filtering.

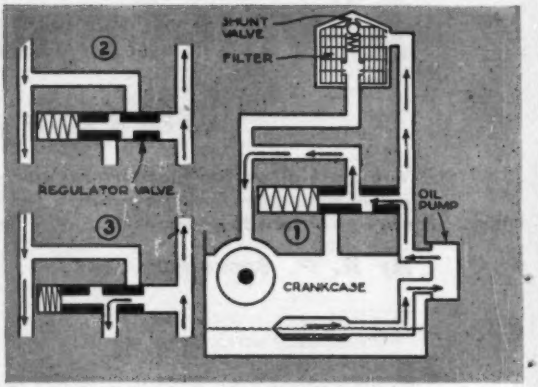
Wash filter element in solvent. Then set the element aside to drain until dry. Mechanics often use an air hose to dry it, but one car maker now discourages this because the blast may mat the mesh together and retard the flow of air. If element has a gasket, clean it well.

Wipe sump dry with cloth after first pouring out dirty oil (from oil-bath type) and washing the sump with solvent. For best results, check your cleaner each 1,000 miles under ordinary driving conditions. If yours is the oil-bath type, service it at once if the sump fills with a thick mixture of dirt and oil.

Pour oil into sump of oil-bath type as below. Never fill above indicated level. In dry type, dip element into oil and let it drain. Don't oil gauze element of an oil-bath cleaner; motion of car will do this. Most car makers specify S.A.E. 50 oil for cleaners in summer, 20 in winter, but some recommend a lighter grade.

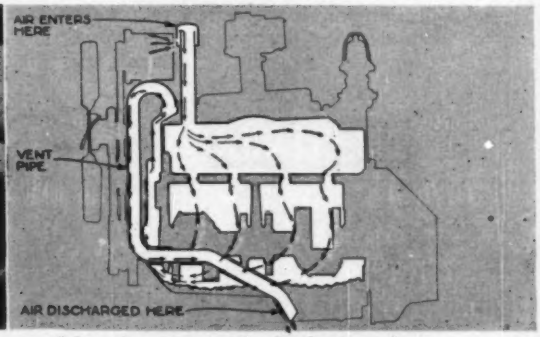
OIL FILTER

The most common oil filter, the by-pass type, is on a separate flow circuit of its own and delivers the filtered oil back to the crankcase where it mixes with unfiltered oil returned from the engine. Thus the mixture that is fed to the engine is only partly cleaned. A filter of the full-flow type is on the regular flow circuit, so it normally cleans all the oil just before it reaches the engine. Clean both types the same way.



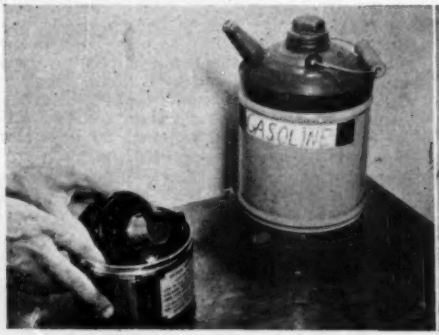
How full-flow oil filter works is shown above. As engine starts, regulator valve momentarily by-passes some oil to engine (1). After filter fills up, valve sends all the oil through the filter (2). If excess pressure builds up during high speeds, valve sends part of oil back to crankcase (3). If cartridge clogs, a shunt valve opens, sending the oil direct to engine.

BREATHER CAP

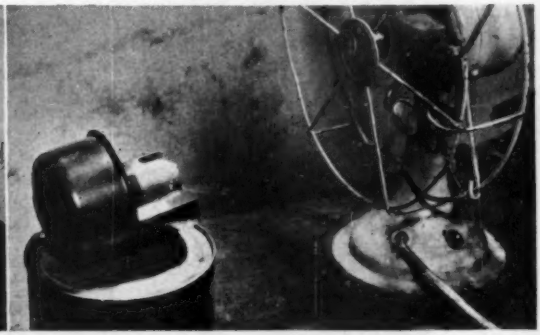


Air drawn into breather cap carries injurious vapors out of the crankcase through vent pipe under the car. In putting back the cap, be careful to place it correctly. In the type above, shield belongs at rear. Others have an air inlet that must face forward toward the fan.

Filter inside cap can be washed by immersing entire cap in a solvent. You can easily do this at home. Use kerosene or white gasoline.



Dry the cap well after washing. You can speed up drying with a fan this way. If you have an air hose, use it to blow out last bits of dirt.

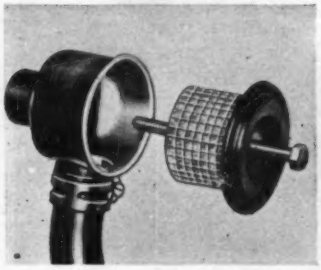


Oil-filter cartridge can be changed quickly during a gas stop, but it's best to have the oil changed at same time. Make sure container is drained and wiped dry inside as above.

Always use new cover gasket when putting new element in this type. The old gasket may leak oil. As a rule, make the change about every 5,000 miles—or when dipstick shows dirty oil.

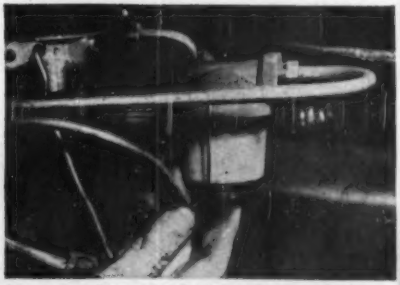
Burning will clean a neglected cap if solvent won't. Pour a little gasoline into cap and set it afire in the open. Let it burn until flame dies out. Shake out residue.

Re-oil cap after it has been cleaned. Pour the oil into it as at left or dip entire cap into container of oil. Use fairly heavy oil. Let the cap drain well before putting it on car.



A vent-pipe filter is used on some cars. It traps the dust when an engine creates a chimney effect as it cools, drawing air up the vent pipe. Wash and re-oil like inlet filter.

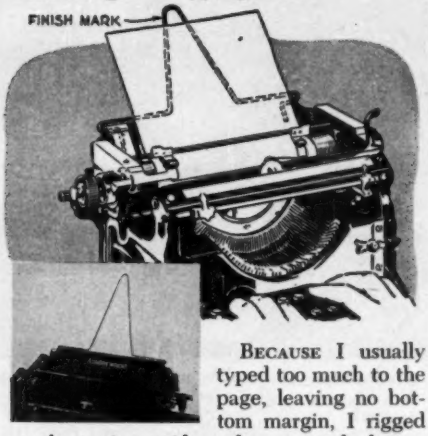
FUEL FILTER



In a gasoline supply line there may be as many as three strainers. There's always one in the fuel pump. There may also be another adjoining the carburetor (above) and a third inside the carburetor inlet. Latter seldom requires attention, but the other two should be cleaned twice a year.

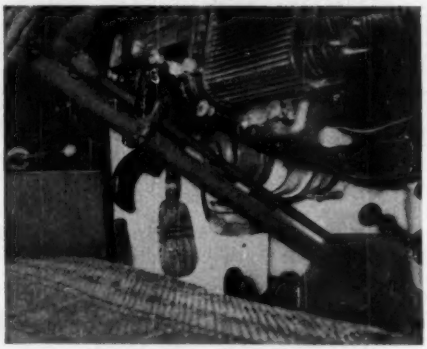
Dirt collects in a filter bowl this way. Empty the bowl and wash it and strainer in solvent. Blow through the strainer gently with an air hose. In putting bowl back, it's a good idea to use a new gasket.

Coat Hanger Is Typing Guide



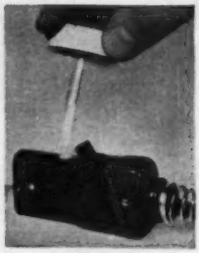
BECAUSE I usually typed too much to the page, leaving no bottom margin, I rigged up the typing guide and paper rack shown. Formed from coat-hanger wire, it clamps to the back of my typewriter. When the paper rolling around the platen reaches two paint spots on the wire, I know I have reached the bottom margin. The height of the rack supports the paper, keeping the typed matter always in view. The method of attaching the rack may vary with different typewriters.—*Bob Gilmore, Boyes Hot Springs, Calif.*

Red Brake Gives Custom Look



YOUR friends will ask if your car is a special model if you apply enamel where I did —fire-engine red on the emergency-brake handle, blue on the heater unit, and white on the fiber side panels under the cowl. The firewall also can be painted a light color if it is first sealed with shellac. A whisk broom suspended on a hook on the side panel, as in the photo, will help you keep the floor mats free of dirt and sand.—*Chauncey E. Nelson, St. Paul, Minn.*

Paint Marks Switch Position



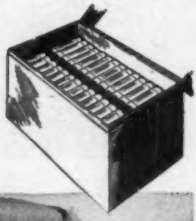
MANY electric-iron cords have plugs with built-in switches, but they're rarely marked so that you can tell at a glance if the current is on or off. A drop of white touch-up enamel will indicate the "on" position and can be seen from some distance.—*H. Leeper, Canton, Ohio.*

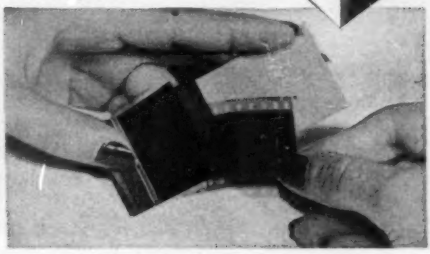
Cable Clamps Make Tool Holders

CLAMPS for BX cable make fine holders for small tools or kitchen utensils. If two clamps are overlapped and mounted with one screw, as shown at left, more tools can be fitted into the allotted space.—*John J. Rea, Urbana, Ill.*

Matchbooks Hold 35-Mm. Negatives

A MATCHBOOK cover, with a number of paper leaves inserted, makes a compact file for single 35-mm. negatives. After removing the matches from the folder, staple in a dozen or so 1½" by 2" sheets of black paper. File the negatives between the sheets and write any photographic memoranda on the paper with a white or yellow pencil. About thirty of these folders will fit in a 3" by 5" card file. Put a block of wood in the bottom of the box to raise the folders near the top and label each folder across the top to identify it.—*John J. Rea, Urbana, Ill.*





Wipe-Clean Edges for Plastic Tops

YOU can top off that furniture you've built with the same gleaming, impervious surface you see on restaurant tables. Nothing beats it for kitchen cabinets, tables, playroom bars, and children's furniture.

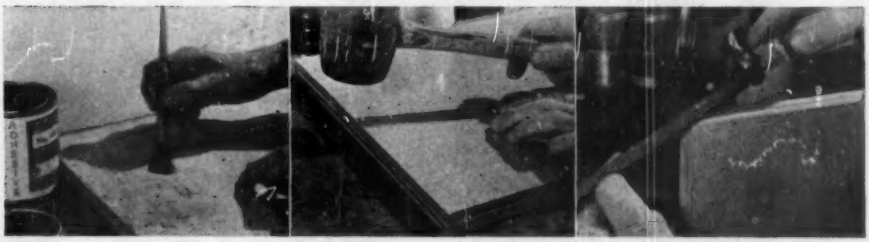
The material is sold under various trade names like Polatex, Formica, and Micarta. It can be bought already bonded to ¾" plywood, but with modern cements you can fasten 1/16" sheet to any wooden surface.

Instead of lipped molding, the photos show a neat edging of 1/32" aluminum strip fitted flush with the plastic surface. This leaves no dirt-catching crack or overhang, and being thin, the strip doesn't require laborious mitering at corners. It's also easy to apply to rounded corners.

Fir plywood ¾" thick makes a good core. Edges should be cut square and the top surface sanded smooth. Make a trial fitting on the furniture before applying the plastic sheet cut 1/16" oversize all around.

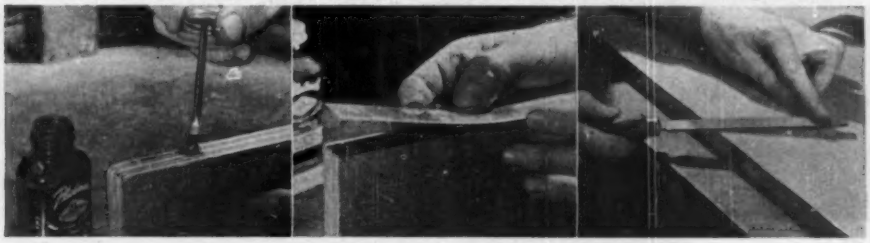
An adhesive that doesn't require clamping is most convenient. You can also use a casein or a resorcinol resin glue, but these call for clamps or weighting. An adhesive designed to hold metal on wood should be used to hold on the aluminum edging, which can be further secured with escutcheon pins or countersunk screws.

Trim the strip flush with both surfaces of the panel, being careful not to mar the plastic top. Where the strip projects a lot, it can be cut down fast with a sharp plane. Rub the aluminum to a satin finish with steel wool.—*W. E. Burton, Akron, Ohio.*



Apply cement both to well-sanded wood top and underside of plastic sheet. Let it dry briefly. Then lower sheet carefully in precise alignment with panel (once surfaces touch, they can't be shifted). Hammering with rubber mallet improves bond with cement shown. After adhesive has set, dress edges of plastic flush with wood. Use a file or run the edges over a jointer.

Cut aluminum strip slightly wider than panel thickness. Cement shown is brushed on both the surfaces, let dry 30 minutes. Then one surface is "activated" (made tacky) with a second thin coat. Apply strip and hold with clamps or cord binding overnight. Then dress it flush with panel surfaces, holding flat file at a slight angle so that it doesn't touch the plastic.



The Tools That Save Homes

Having this government-recommended arsenal always ready will help you ward off costly repair bills.

By George H. Waltz, Jr.

PS STAFF PHOTOS

DEFENDING a home against the ravages of time is easy if you have the right tools in the right place at the right time.

The young homeowner pictured below is well armed for 1951 because he has consulted government handbooks on home maintenance and built himself a rack on which he can keep and carry the tools that the experts say are needed most often in a

Ready to go with the basic tools, this homeowner is set to face any repair problem from patching a concrete walk to fixing the roof.

typical American home. On the following two pages you'll see these 36 basic tools.

The portable tool rack has all the advantages of an over-the-bench type and none of the disadvantages of the usually cluttered toolbox.

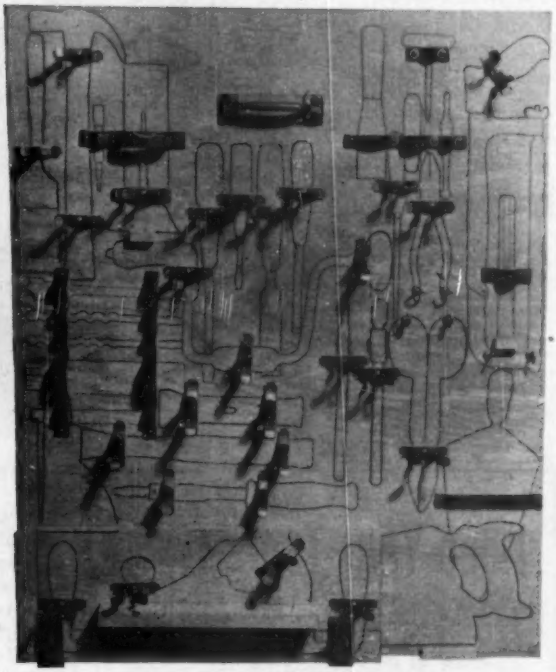
Each tool is always in plain view and each tool can easily be lifted off and put back. If a tool is missing, its outlined empty spot tells you so. Besides, since the rack can be carried to any part of the house, all your tools will be right at your elbow no matter where you are working.

The rack completely eliminates those needless trips to the cellar for a screwdriver or a hacksaw that you didn't think you'd need. Finally, the rack is easier and cheaper to build than the simplest kind of tool chest or cabinet.

Basically, the rack is nothing but a rectangle of plywood fitted with easel-type legs that can be folded flat and fastened when the rack is being carried. When not in use, the rack can be stowed in a closet.

The fasteners used to hold the tools in place are such easy-to-get things as spring clips and strips of leather and rubber. The complete rack, including lumber, shouldn't cost you more than $5. And it can be built with the simplest tools.

Here's the Rack and How to Build It



Follow this tool layout and you'll be able to fit neatly 36 tools on your portable rack. Rear view shows legs locked open by hook and catch used to hold legs closed.

THE tool board is plywood—¾″ by 26″ by 32½″. The plywood legs are ¾″ by 1½″ by 32½″. They are attached at the top corners of the board by 3″ strap hinges. A 6″ hook fits a screw eye on the spacer between the legs to lock the legs in an open position. When the legs are folded for carrying, a snap catch holds them flat against the back of the board.

The saw compartment is a piece of ¾″ by 6¾″ by 17¾″ plywood mounted on ½″ by ½″ spacers at top, bottom, and left end. A ½″ by ½″ by 2¾″ block supports the handle end of the saw. The plane rests on a ¾″ by 1½″ by 10½″ block of wood.

To protect the rack, brush on a coat of clear lacquer after the outlines of the tools have been painted on the board.

Here are the 36 basic tools Uncle Sam's experts feel that the householder should have. How many of them do you lack?

- CLAW HAMMER
- HATCHET
- NAIL SET
- CHISEL (1/4")
- CHISEL (7/8")
- COLD CHISEL
- SMALL SCREWDRIVER
- LARGE SCREWDRIVER
- JACKKNIFE
- DRAWKNIFE
- PUTTY KNIFE
- MASON'S TROWEL
- HANDSAW (CROSSCUT)
- HACKSAW
- GIMLET
- MONKEY WRENCH
- STILLSON WRENCH

Keep Your Tools Fit

JUST as important as having the right tool for the job is having it in good shape to do the job right. Here are a few tips that will help you to keep your tools in top working condition:

Screwdrivers. Don't use them as pries or jimmies. Always match the screwdriver to the screw slot; don't try to drive a large screw with a small screwdriver.

Jackknife, chisels, drawknife, and smoothing plane. Keep them sharp. There is nothing more discouraging than trying to use dull cutting tools. Protect their cutting edges. When a plane is not in use it should be stored so blade won't be injured. Avoid nails. Warn your family, particularly the feminine members, not to use your chisels as screwdrivers.

Wrenches. Don't use them as hammers. Oil them occasionally to prevent rust. Adjust jaws snugly against work to prevent scoring jaws and work.

Putty knife and trowel. Keep them clean and free of rust. Don't let cement, putty, etc., harden on them.

Hand saw. Keep it sharp and oiled to

SMOOTHING PLANE
THREE-CORNERED FILE
SOLDERING IRON
WIRE-CUTTING PLIERS
BRACE AND BITS
GLASS CUTTER
METAL SHEARS
FRAMING SQUARE
FOLDING RULE
PAINT BRUSH
GALVANIZED BUCKET
SMALL WASH TUB
FORCE CUP
STEPLADDER (6')
OIL CAN
OILSTONE
FLASHLIGHT
CARPENTER'S PENCIL
FUNNEL

prevent rust. Avoid nails. Buy a good saw and keep it in good condition. It will save you time and effort.

Soldering iron. Keep it clean and the tip always tinned ready for use.

Paint brush. Always clean it immediately after use and store it wrapped in folded paper to maintain its shape.

Brace and bits. Keep the bits sharp and both brace and bits free of rust. Avoid nails.

Pliers. Keep the cutting edges sharp. Prevent rust. Don't use as a hammer.

Steel square. Oil occasionally to prevent rust. Keep it out of contact with other tools to preserve its scale markings and straightedges.

Nail set. Don't attempt to use it as a punch.

Oilstone. Clean its honing surfaces occasionally with a brush dipped in kerosene. Avoid any contact with tools that might chip or mar the honing surfaces.

Stepladder. When it is new, sand off any rough edges or splinters; then wax it. A coat of wax will make it easier to remove paint splatters and other stains.

Force cup (plumber's friend). Wash the cup thoroughly after use. Grease, if left on, may damage the rubber. END

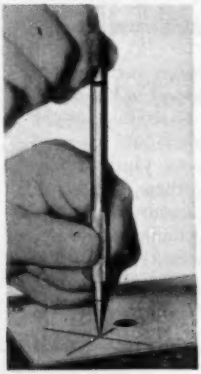
Extra Felting Improves Sander

METAL flanges on the platens of inexpensive electric sanders can gouge and mar the work if the tool is tipped up. An extra thickness of felt over the platen pad provides increased clearance to help prevent this. Glue on the felt as shown. Material from a discarded fur-felt hat is good, for it's thicker than ordinary felt, and costs nothing. *—Walter J. Waldon, Freehold, N. J.*

Cheese Spreader Applies Glue

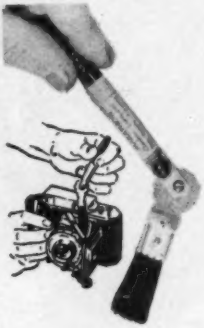
YOU may find a plastic cheese spreader superior to a brush for applying a thin, even coat of household cement or glue. Be sure to wipe the blade clean after use.

Centerpunch Has Its Own Hammer



THE depth of indentation made by this spring-powered centerpunch is controlled by the height the head is lifted and the number of times it is released. The higher the head is pulled up, the harder the spring inside drives the punch point into the work. It's priced at $1.50 and manufactured by Lakelin Products Co., Dayton, Ohio.

Pivoted Brush Turns Corners



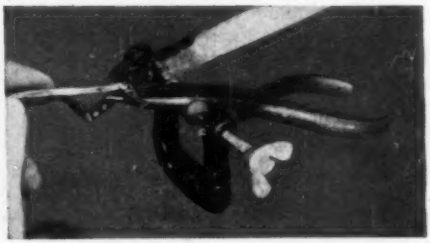
THE brush from a discarded typewriter eraser, pivoted in a handle as shown, is convenient for dusting photo equipment. I attached the brush to a plastic key holder, but a slotted-end dowel will serve as well. Remove the eraser and attach the brush to the handle as tightly as possible with a screw. Bent at an angle, the brush simplifies the problem of dusting the folds inside a camera bellows. *—John J. Rea, Urbana, Ill.*

Bag Protects Casting Reel on Rod

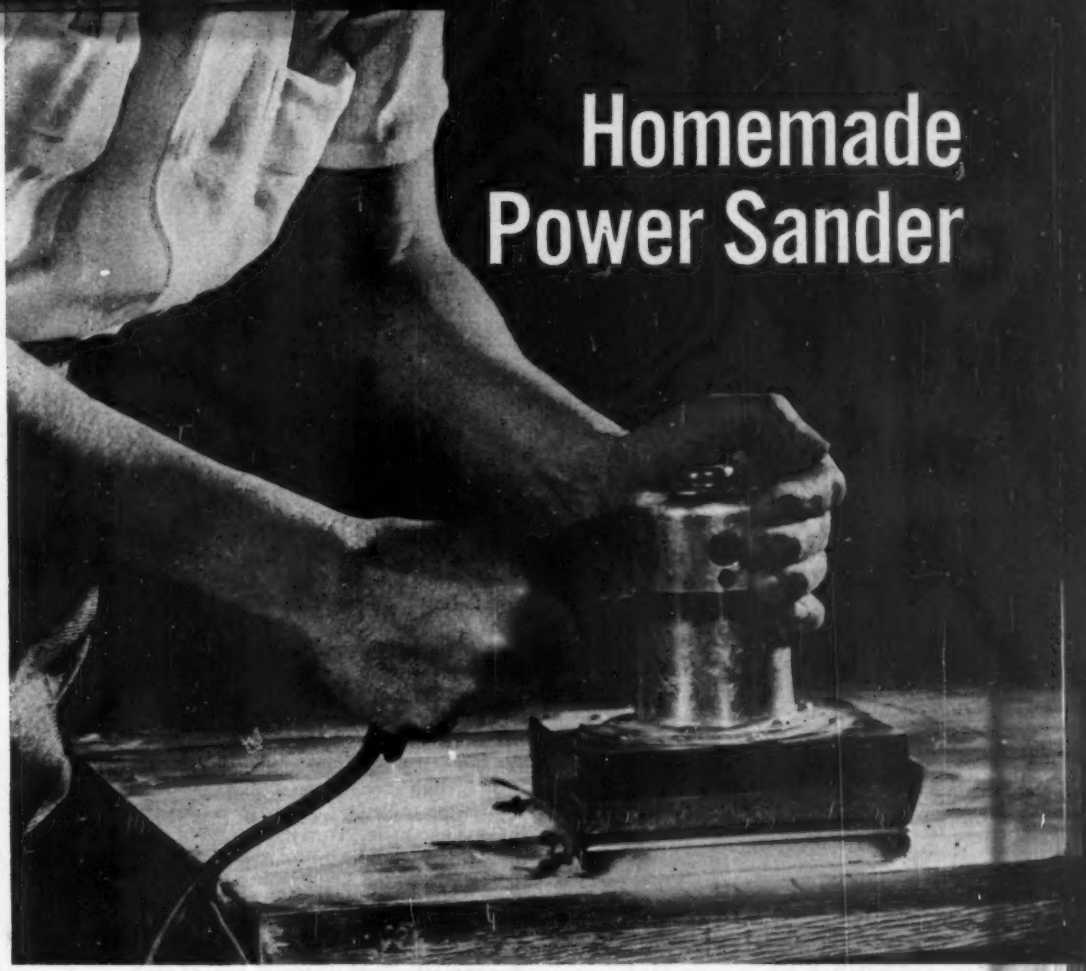
A CASTING rod can be kept ready for use at all times with the reel in place if you protect the line as shown below. Equip the open end of a small bag with draw strings, and cut and stitch a hole in the other end just big enough to slip over the butt of the rod. Pull the draw strings tight ahead of the reel. The rod can then be carried through brush that might snag the reel. *—E. V. Reyner, Townsend, Mont.*

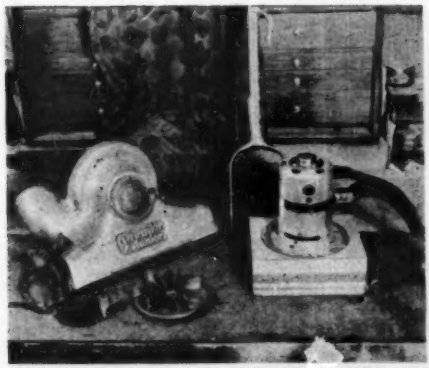
Clamp and Pliers Form Tiny Vise

IF YOU don't have a suitable vise for holding jewelry or other small objects for soldering, try improvising one like this. Grasp the object to be soldered with narrow-nosed pliers and tighten the pliers in a small C clamp. Put the clamp just past the pivot. *—J. Van Siclen, Queens Village, N. Y.*



Homemade Power Sander





What's left of vacuum cleaner after sander has been built is shown at left. Only parts of vacuum you need are motor and belt pulley.

For a few dollars you can build it from an old vacuum-cleaner motor. Other parts will come from your scrap box.

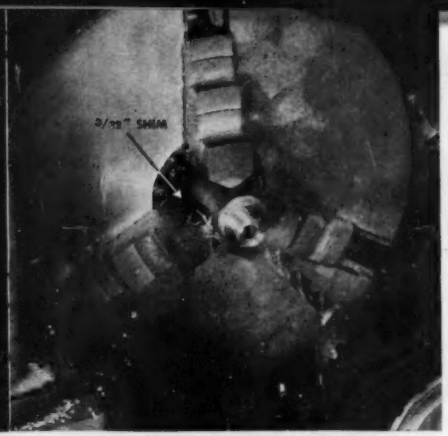
By Herbert Pfister

PUTTING a professional finish on your woodworking projects is easy with this sander-polisher. It will leave most any wood surface satiny smooth, and then follow up by doing the tedious job of polishing. And all with little effort on your part.

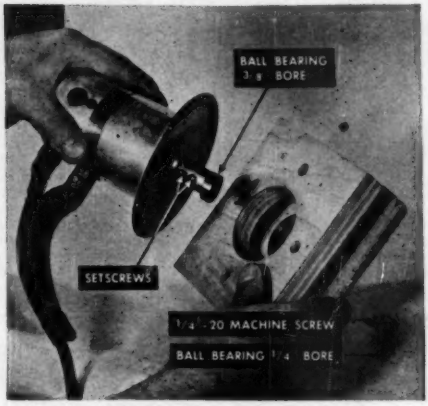
The principal part of the machine is an old vacuum-cleaner motor. If you don't have one, you can pick one up secondhand for a few bucks. The light-duty type shown does fine.

Other than the motor, you'll need two

Pulley for the belt that drove the vacuum's brush is cut off, as shown above, before the remaining stub is turned off center.



Shim under one jaw holds piece off center. After turning, the eccentric end is drilled and tapped for the ¼"-20 retaining screw.



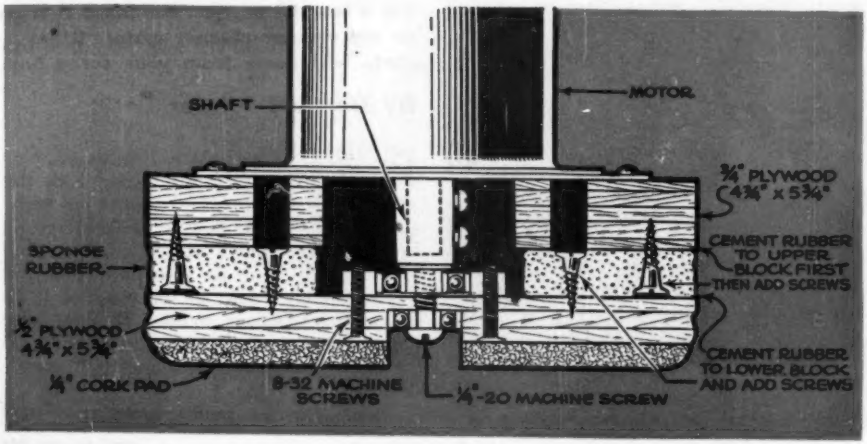
The ⅜" ball bearing on eccentric slips into steel disk fastened to movable block. Disk is just visible through hole in motor block.

ball bearings, sponge rubber, a few screws, and plywood from your scrap box. A foot rheostat for a sewing machine is handy for controlling the sander's speed.

The sander operates on an eccentric principle. One end of the motor belt pulley is turned off center. The eccentric end turns in a ball bearing set into the moving block. Thus when the shaft turns, the sanding block moves in a tight circular orbit.

Chuck the belt pulley in a lathe with a 3/32" shim under one chuck jaw. This throws the pulley off center so you can turn the end eccentric. Turn it down to fit snugly in a ⅜"-bore ball bearing. Also drill and tap the eccentric end ¼"-20.

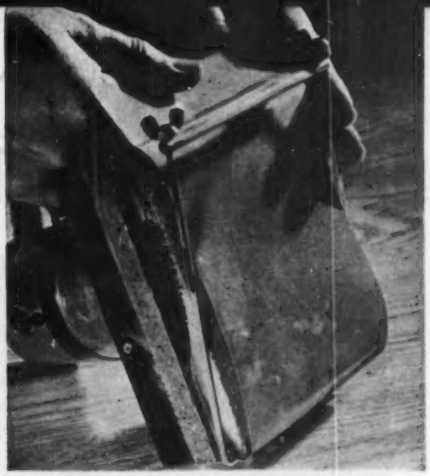
The outside of this ball bearing fits within a ¼" steel disk that is bolted to the moving block. A recessed washer about 1¾" in diameter—the kind that goes on a shaft be-



tween a grinding wheel and a nut—will do for the disk. Bore it out to a snug fit for the bearing. Also drill and tap the disk for the four 8-32 machine screws that hold it to the moving block.

Two pieces of plywood and a slab of sponge rubber make up the motor base and moving block, as shown in the drawing on the preceding page. A ¼"-20 machine screw through the bottom and into the tapped hole in the eccentric locks the whole assembly together. Cut the ¼"-20 screw so that it turns tight or bottoms before pulling up on the inner race of the ¼"-bore ball bearing.

A handle from a glass coffee maker can easily be adapted to the sander. Just shorten the steel band to fit tightly around the motor. The ⅜" steel rod around the lower block holds sandpaper in place. END



U-shaped paper clamp was bent from ⅜" steel rod and threaded 5-40 on ends for wing nuts. Steel rod across U holds one end of paper.

Hose Clamp Repairs Tool Handles

NEED a new ferrule for repairing that favorite garden tool? A hose clamp makes a good one and can be made tight even on a splintered or otherwise damaged handle. Since it opens, you needn't even pull the tool shank out of the handle to put the clamp on.—*Robert Hoppough, Encino, Calif.*

Marking Device "Brands" Your Tools

WITH the Moto-Write, a vibrating marking device that looks like a chubby pencil, you can "brand" all your tools from screwdrivers to lawn mowers. It uses 115-volt AC, and by changing the bit you can etch glass or tool leather. Montgomery and Co., New York City, sells it for $6.00.

HARD AND SOFTWOOD

A softwood does not necessarily come from a tree whose wood is soft, nor is a hardwood always one that is hard. Some softwoods are harder than many hardwoods and a few of the hardwoods are among our softest woods. No definite degree of hardness divides the two groups.

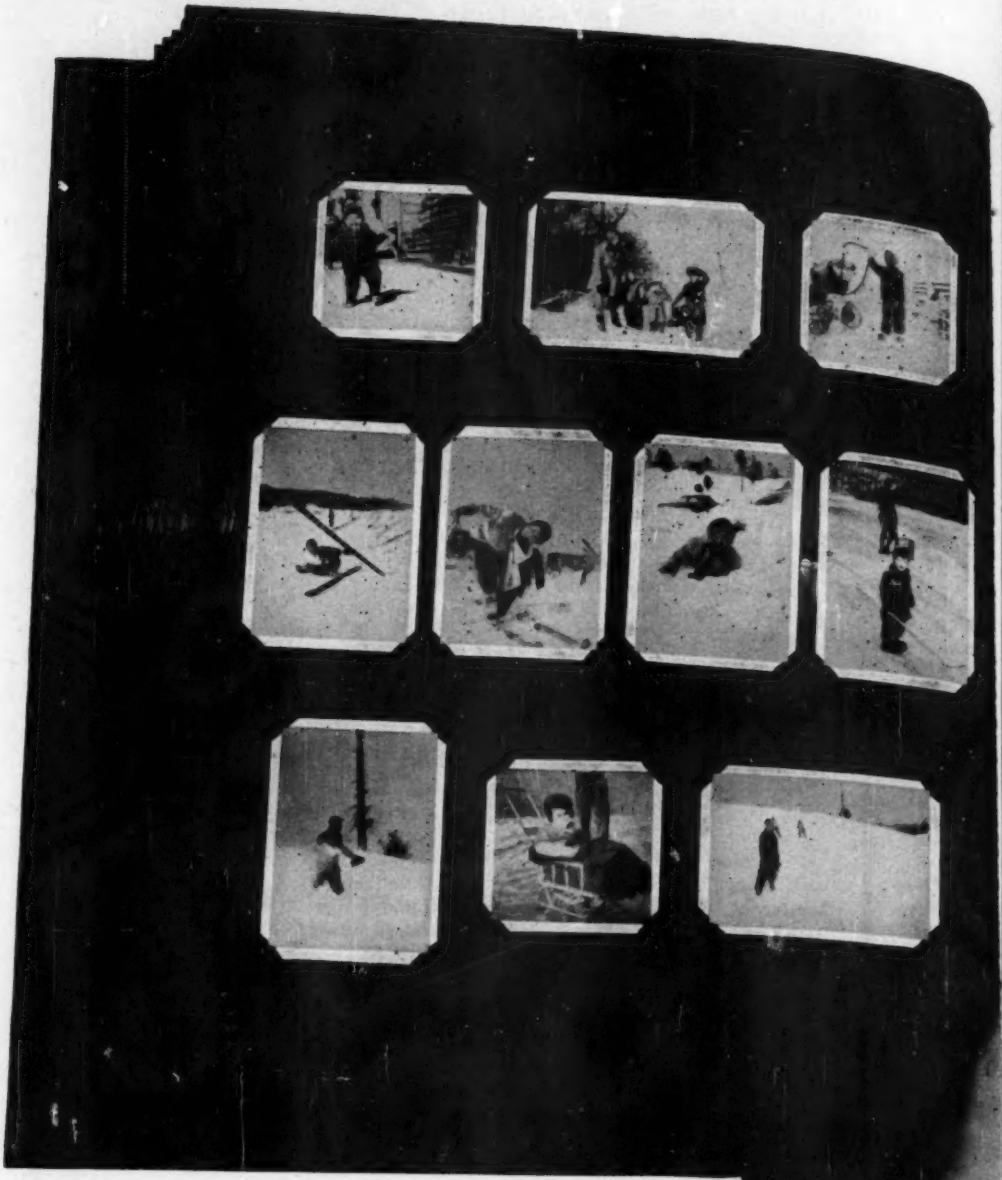
The distinction is this: In the lumber trade, there has developed a custom of calling the coniferous trees softwoods and the broad-leaved trees hardwoods. Coniferous trees, popularly called evergreens, are those with needles or scale-like leaves. Broad-leaved trees are often termed deciduous because most of those in the United States shed their leaves each year.

According to the National Lumber Manufacturers Association, softwoods found in the United States include the cedar, juniper, cypress, Douglas fir, true fir, hemlock, larch, pine, redwood, spruce, tamarack, and yew.

Hardwoods include the alder, ash, aspen, basswood, beech, birch, buckeye, butternut, cherry, chestnut, cottonwood, elm, gum, hackberry, hickory, locust, magnolia, maple, oak, sycamore, walnut, willow, and yellow poplar.

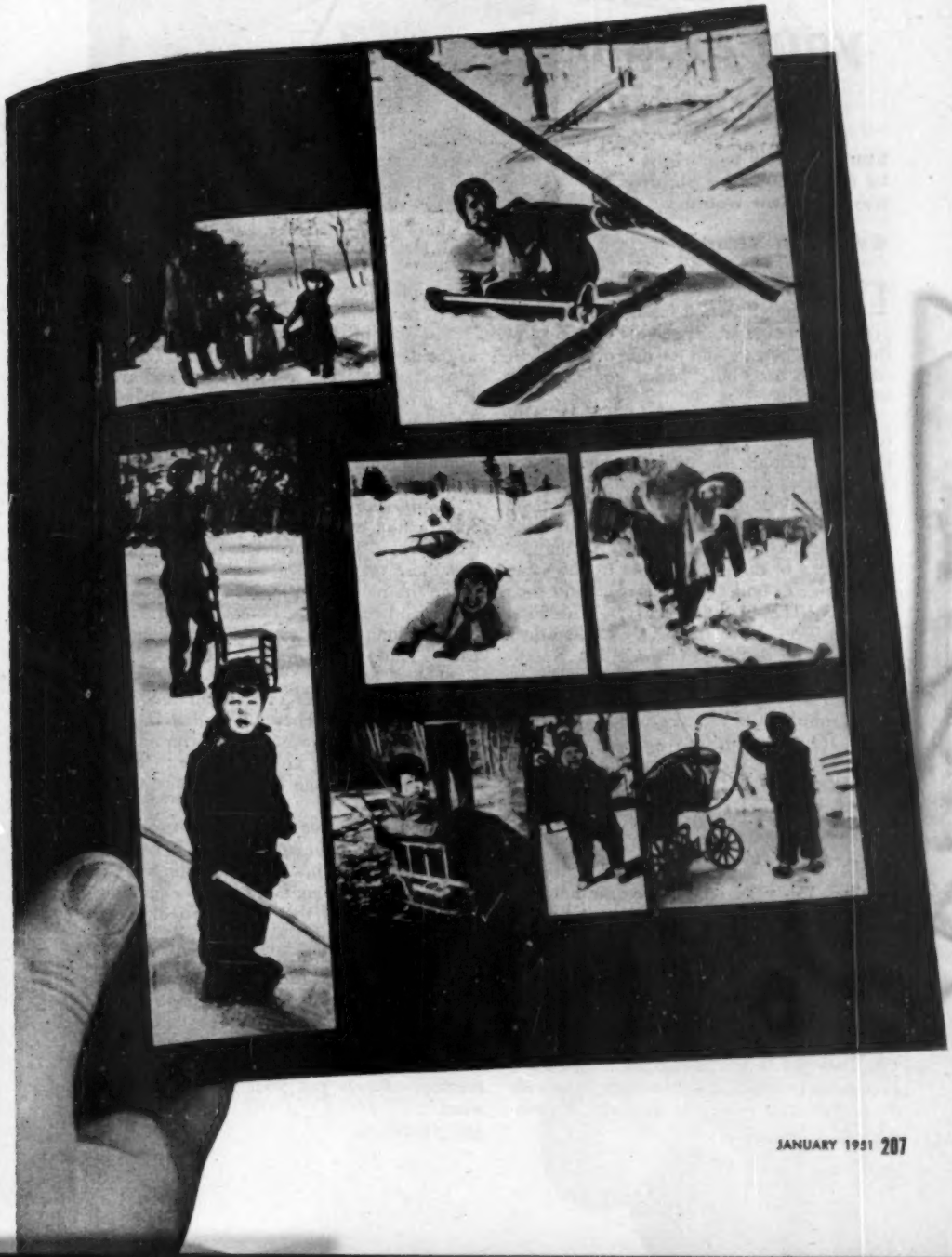
FOR YOUR POPULAR SCIENCE INFORMATION FILE

Does Your Album Look Like This...



...or This?

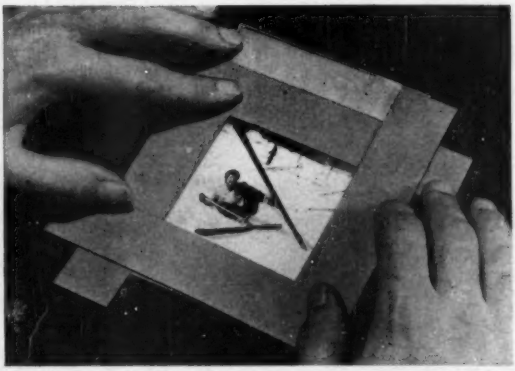
You'll find the difference between these pages explained on the next page.



...it's fun to make your album attractive

Start the new year right by laying out your pictures the way an editor would.

By Ralph Steiner



Trim each photo before mounting. Use L-shaped pieces of cardboard like this to find most interesting area.

DOES your photo album look drunk and disorderly? Does it follow the after-the-cyclone school of art? It needn't—if you know the rules. The care and feeding of the album can be an absorbing parlor game for the whole family.

Look at the two previous pages. The left-hand page is typical of many albums. It looks as though the pictures were pasted down just as they came from the photo finisher's envelope—first come, first pasted—in even rows like windows in a factory. But the page does have a unifying idea. All the pictures have to do with winter. In the same way, you can build your pages around such ideas as "The Birthday Party," "The First Trip in the New Car," and "Dorothy's Dresses from Birth to Marriage."

Pruning. The page was improved, as you can see, by pruning down the pictures to get rid of wasted space, then re-arranging them. It's easier for most people, including many professional photographers, to make good compositions by cutting down prints—instead of trying to do it in their finders when they snap the picture.

Two pieces of "L" shaped cardboard cut out of shirt stiffeners are handy marks in pruning. They can be shifted around on each print until all the uninteresting waste areas are framed away. In this case, we found much of the ice and snow areas could be cut away from the pictures without losing the feeling of winter.

Your eyes feel better looking at the cut-down pictures for much the same reason that your ears feel better when static is tuned out of a radio program. For photographers with an engineering bent, try thinking of yourself as picture engineers whose job is to make every picture 100 percent efficient.

The shot of the girl with skis was chosen as the most interesting and striking. To make it so, it was marked for a blow-up and given star position on the page. The picture of Junior with the hockey stick, when trimmed, came out an interesting shape. It too was set aside for enlarging and for second billing on the page.

Re-arranging. When the enlargements were ready, we found we had only one unusual shape. You may come up with many. But these may help, not hinder, you to arrange the pictures to make a page look different and intriguing. Long, thin strips can be run along the sides; a big round picture can be made the center for a circle of smaller photos.

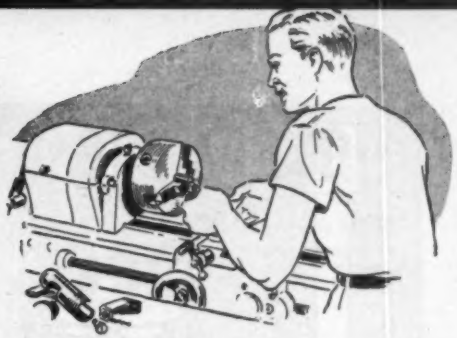
Our four pictures of a small boy were grouped together. These, as well as the two squares of the girl skiing, were run edge to edge. This not only saved space but gave us a page with only four blocks of space to engage the eye.

White borders were lost in the trimming. But since our album page was black, we considered this a gain, because white borders on black pages can be more eye-catching than the pictures themselves. So off with them!

Two of our pictures went in the waste-basket. Even when ruthlessly trimmed, they looked like the two bad apples in the barrel. So out they went. If you haven't a surgeon's courage, reserve a few pages at the end of your album for such also-rans. But remember—always put your best photo forward. END

Turn Yourself a Lighter

Here's something you'll enjoy making as well as carrying in your pocket.



NO CIGARETTE lighter you buy can mean as much to you as one turned out in your own shop. It makes a fine project to keep your hand in between bigger jobs, or to learn basic techniques on a new lathe. This lighter works in wind, has a big fuel capacity, and is so sturdy and simple it will never get out of order.

Monel metal is the ideal material, but stainless steel, bronze, or even brass will do. You can make the sparking wheel by knurling a piece of 7/16" drill rod and hardening it, or take a wheel from an inexpensive new lighter.

Tank top. Chuck stock with more than enough protruding to make the entire piece. Face, turn the edge radius and wick tip, and turn the shoulder with a parting tool. File smooth and polish with emery cloth before parting off.

Tank. It's easier to make this of tubing than solid stock. Chuck a 3" length of thick-walled tubing (with a maximum bore of ½") so that about 2" projects. Turn the outside, and bore carefully to a tight fit for the tank top. Cut the threads on the lathe too.

Plug. Leave enough out of the chuck to turn, thread, and cut off with a slight allowance for facing the knurled end afterward. File the knurled edges slightly.

Screw the plug snugly into the tank and insert the top. Put wooden pads against both ends; then squeeze the assembly in a vise to press the top home.

Post holder. Bend a 5/16"-wide strip of 1/16" stock lengthwise over a piece of steel 11/16" in diameter. This is to produce the curve matching that of the tank. Then clamp it to the steel to bend up the ends. Drill the four holes, taking care that the two larger ones are accurately located to hold the post parallel to the tank.

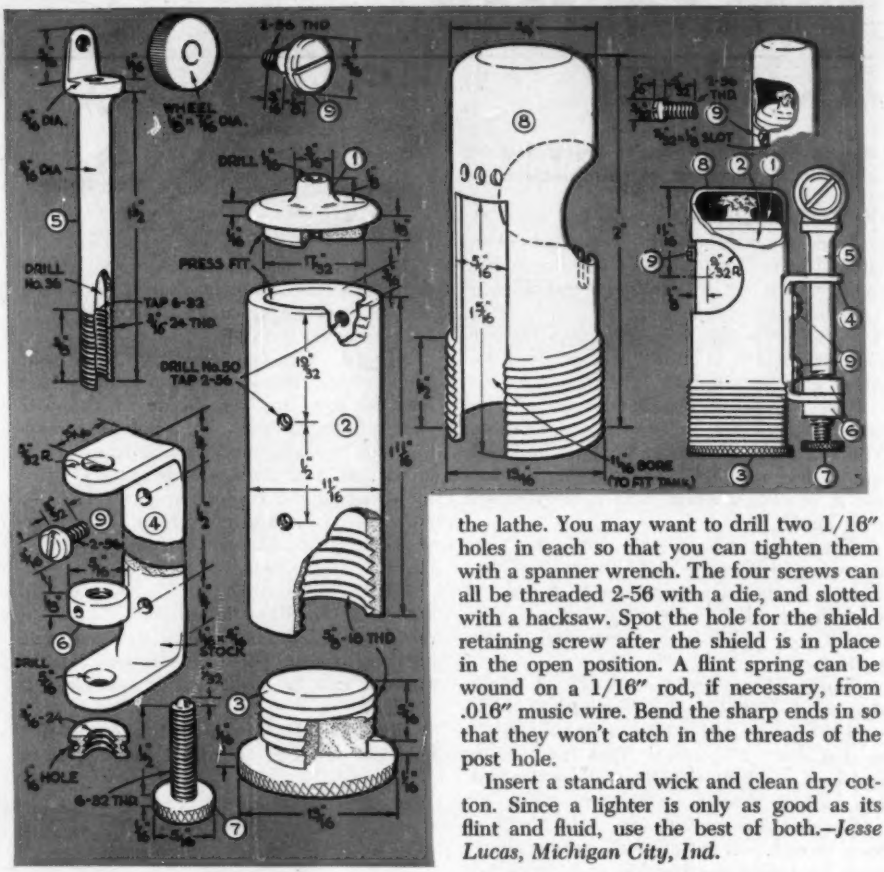
Post. Leaving 1 9/16" of a piece of 5/16" rod out of the chuck, centerdrill, and run a No. 36 hole through. Tap 6-32 to ⅜" depth. Then turn to 3/16" diameter for 1½". Cut the outside thread almost full, finishing with a 3/16"-24 die. Polish and cut off.

Check your wheel size before shaping the top of the post. Spot the shaft hole to leave minimum clearance under the wheel, to insure using all the flint.

Shield. You can bore this from solid stock, or use tubing and silver-solder a plug into the top. Bore the inside to a smooth sliding fit on the tank. Use a pointed threading tool to make the gripping rings at the lower end. You can space them .050" apart by swinging the compound parallel to the lathe ways and using its feed. Turn rings .025" deep, round each one on top with a fine file, and polish.

File the flame opening to a depth of half the diameter. Slide the shield on a rod or dowel to drill out the slot at the back. File the slot to size. The three air holes above the slot can be drilled after assembly, if needed.

Fittings. The two round lock nuts that hold the post can be drilled and tapped in



the lathe. You may want to drill two 1/16" holes in each so that you can tighten them with a spanner wrench. The four screws can all be threaded 2-56 with a die, and slotted with a hacksaw. Spot the hole for the shield retaining screw after the shield is in place in the open position. A flint spring can be wound on a 1/16" rod, if necessary, from .016" music wire. Bend the sharp ends in so that they won't catch in the threads of the post hole.

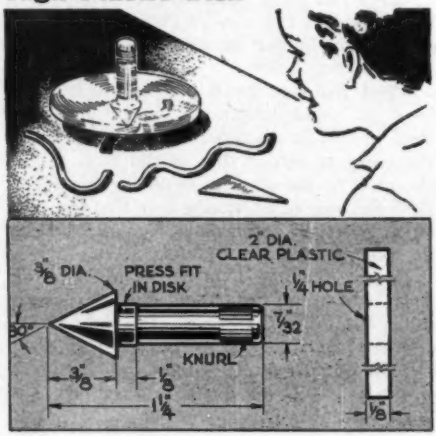
Insert a standard wick and clean dry cotton. Since a lighter is only as good as its flint and fluid, use the best of both.—*Jesse Lucas, Michigan City, Ind.*

Magnetic Top Shows Action Through Plastic Disk

In half an evening you can make this unusual toy for the children. It should keep them busy for hours.

The top is given a hard finger-tip spin on a smooth surface. Then bits of ferrous wire, nails, or tin-plate cutouts are pushed against the turning point. Magnetism and friction take over, endowing the pieces with a curious motion of their own as they "walk" along the spinning point. The action is completely visible through the transparent disk, so the kids miss none of the fun.

Turn the shaft from ⅜" drill rod with a shoulder for the disk. Heat it to redness and quench to harden it. Magnetize it by rubbing it on a strong magnet. Press the disk on, and if necessary turn the edge down so it runs dead true.—*J. C. Magee, Schenectady.*



You Can Have Direct Current in Your Shop

It pays the craftsman to know what can be done with selenium rectifiers.

By Ray Millholland

RUMMAGING in surplus stores, you may still find high-quality, ball-bearing motors, so well built they'd delight any mechanic's heart. Prices are low. But those motors stay on the counter, for the name plates say "Direct Current."

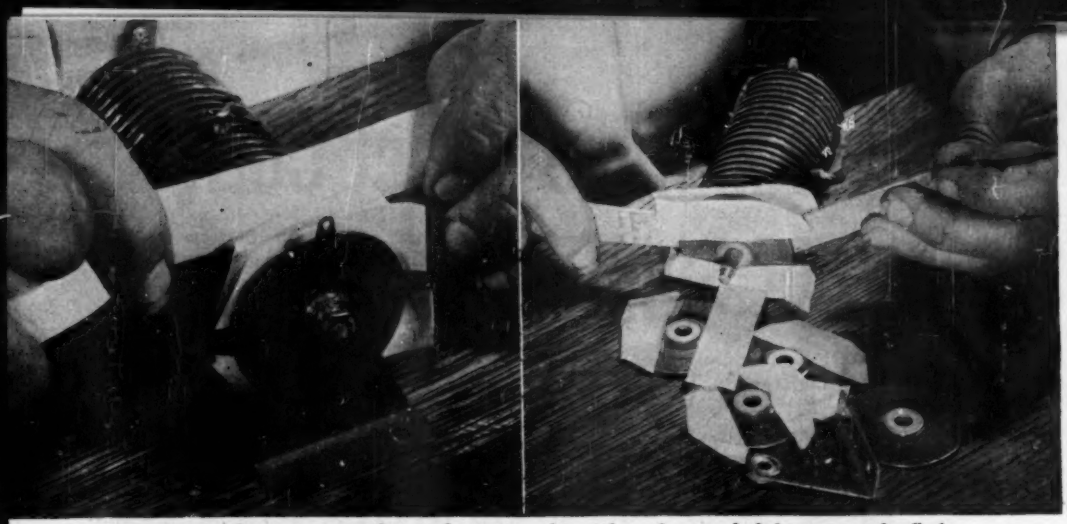
You may have wished you could recharge your car battery right in the garage when it needs a boost. Perhaps you've thought of taking a crack at electroplating. And some day you may plan to have a two-rail miniature railroad layout. But all these things also require direct current, and the only place you have DC is in your flashlight.

Stymied? Not at all. You have ample power in your AC house lines, and you can turn that kind of juice into direct current. Selenium dry-plate rectifiers, which are a row of disks or plates between mounting brackets, will do it.

Maybe you've passed these devices by on the counters because there wasn't a name

Electroplating setup consists of small transformer and the full-wave rectifier diagramed in Fig. 9. Four disks are stacked on an insulated bolt. The resistor at right in the photo adjusts current to suit various sizes of work.

Power buffing with a DC motor driven from the house AC line. High-quality motors of this sort sometimes go for bargain prices. The four rectifiers, which safely deliver up to 2 amp., should be used in the open for ventilation.



First step in taking apart rectifier stacks is to tape each disk on the brass-electrode side like this. Then the taped disks are pried off the through bolt with paddles, as shown above.

plate—no clue to what voltage or current they'd handle, or how to hook them up. Here's the dope:

One-way conductors. Basically, any rectifier acts like a check valve in a water

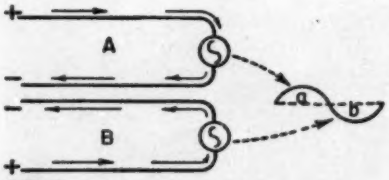


FIG. 1

pipe—it will let juice pass in only one direction. Familiar 60-cycle AC flows alternately first one way and then the other, 120 times a second. In an ordinary lamp circuit, for instance, (Fig. 1) it flows first as in *A*, and 1/120 second later reverses itself as in *B*. Graphically this action is represented by the two loops *a* and *b*, and the resulting wavy line is called a sine wave.

Put a rectifier in the circuit as in Fig. 2, and current can flow only in one direction. It doesn't flow all the time; the one-way

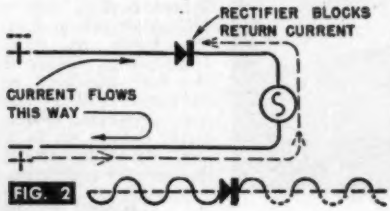


FIG. 2

valve just cuts off half of the sine wave, and you have an intermittent or pulsating direct current. For lots of applications this is all right. When you need the whole wave, you can hook up another rectifier to get the other half as well.

The basic unit of a selenium rectifier stack is a little sandwich shown in cross section in Fig. 3. The back electrode is a steel plate coated with selenium. Clamped to it by an insulated bolt is a brass contact disk.

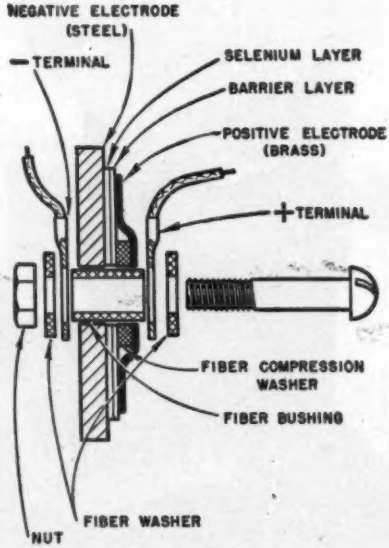


FIG. 3

An element like this will stand 12 to 16 volts of reverse potential—which means that above this, it may not do its check-valve job. To rectify higher voltages, you use two or more elements in series.

The amount of current (amperage) an element will handle is limited by the heating effect, which depends on the disk size and cooling area. The bigger the steel plate, the more juice it will handle. Disk temperatures should not exceed 160° F. You can increase capacity by clamping extra cooling fins to the plates, by playing a fan on the stack, or by both.

Taking a stack apart. The 24-plate unit shown in the photos is a typical surplus item. The disks are 1¾" in diameter. It's rated at 120 volts, .22-amp. output. But this rating is for use in a confined space; out in the open the disks will handle .5 amp. nicely. With fins, and fan cooling, they'll handle up to 1 amp.

If you want line-voltage output, you'll use the stack as it is, but for lower voltages it's taken apart and rebuilt. Apply two strips of cellulose tape firmly to the positive side of each cell, or plate, as shown in one of the photos. This prevents the thin brass electrode from pulling off the selenium layer.

Now you can remove the nut on the end of the stack and pull the long bolt out of the fiber tube or bushing on which the plates are stacked. Then, with tongue depressors or similar wooden paddles, pry off the disks one at a time. You'll wind up, in this case, with 24 separate rectifiers.

Figure 3 shows a single cell with the necessary fiber bushing (cut off the original long one), washers, and terminal lugs. The bolt is completely insulated from all parts of the rectifier by the bushing and fiber end washers. This single plate, hooked up in a series circuit, would give you half-wave rectification, safely delivering up to 12 volts and .5 amp.

Should you want to draw up to 1 amp., you could fan-cool this single disk, or use two disks in parallel as in Fig. 4. The two could be mounted separately, or stacked on a single bolt *with an insulating washer between them.*

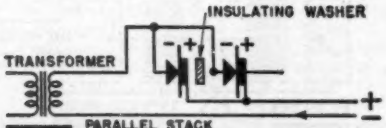


FIG. 4

Half-wave 24-volt unit. For running 24-volt DC motors, charging batteries, and many other jobs the half-wave, intermittent DC diagramed in Fig. 2 will serve nicely.

Since a single plate will stand 12 volts of reverse potential, you need two in series to handle 24 volts. If your load won't be more than .5 amp., simply assemble two plates on a bolt, so that the brass disk of one cell clamps against the steel disk of the other, as in Fig. 5.

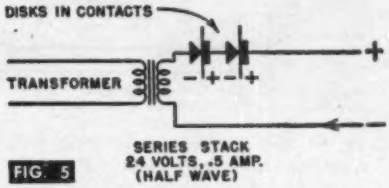


FIG. 5

To get 3 amp. at 24 volts, you'd simply connect six such two-plate pairs in parallel (Fig. 6). The two plates of each pair touch, but each pair is separated from the next by insulating washers, as shown in the diagram. All the positive (brass) plates are connected to a common bus bar, and all the negative (steel) plates to another.

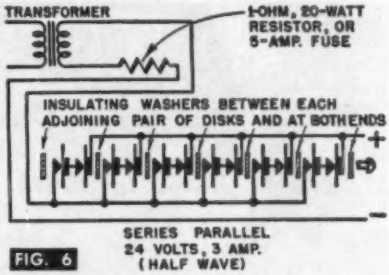


FIG. 6

Battery trickle charger. To pep up a car battery overnight, you can build this 3-amp. charger (Fig. 7) from six rectifier disks and a small constant-duty transformer rated at 75 watts or better. Clamp up the

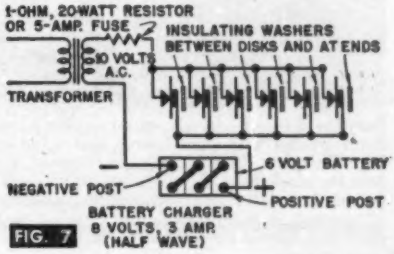


FIG. 7

disks with insulating washers between all of them, and connect all positive sides to a common lead (which will go to the positive battery post). All the negative electrodes are common to one side of the transformer, which should have a 10-volt winding. Put a 5-amp. fuse in the output line to protect the rectifier and transformer in case of a

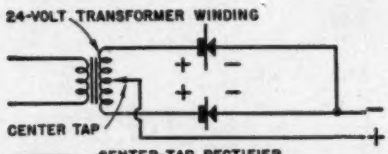


FIG. 8 CENTER-TAP RECTIFIER 12 VOLTS, .5 AMP. (FULL WAVE)

short, or else provide a limiting resistor.

Getting the full wave. For electroplating, hum-free relays, and other applications that need full-wave rectification, you can hook up the disks in two ways. The simpler calls for a transformer with a center-tapped secondary. Most radio filament transformers are this type. The basic circuit is the one shown in Fig. 8 on this page.

Here the two outside leads of the transformer secondary go to the positive (brass) electrodes of two rectifier disks, mounted on a common bus bar or metal strip joining their negative electrodes. This bus bar becomes the negative DC lead; the center tap of the transformer, the positive.

Your DC output will be about half the AC voltage across the transformer secondary, so you'll need a transformer giving 24 volts if you want 12 volts DC. What happens here is that half the sine wave scoots through one rectifier, and the other half (blocked by the first disk) goes through the second. Although this type of circuit isn't recommended for more than 12 volts, you can get more amperage by stacking disks in parallel.

Full-wave bridge circuits. In these, the disks are assembled like two half-wave rectifiers with their positive terminals in contact at the middle of the stack (Fig. 9).

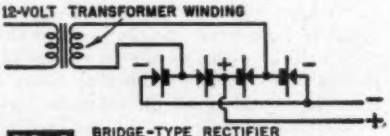


FIG. 9 BRIDGE-TYPE RECTIFIER 12 VOLTS, 1 AMP. (FULL WAVE)

The AC input straddles the center pair. The two negative end electrodes are joined to form the negative DC lead. Each disk is subject to the full working voltage, so 12 volts is the rating for the circuit.

For higher outputs, add more disks in series or parallel as required. For 24 volts, 1 amp., you'd need two 1¾" disks in series (one behind the other) for each one shown in Fig. 9. For 2 amp. and 12 volts, you'd connect two disks in parallel (side by side) for each one shown.

Using the whole stack. For 115-volt DC motors, solenoids, and the like you can use 24-plate stacks as they come, either by connecting up just half a stack as a simple .5-amp. half-wave rectifier, or by hooking up two stacks as a full-wave bridge rectifier

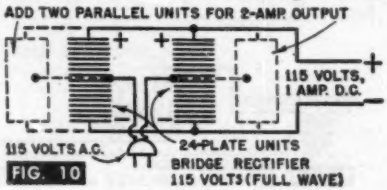
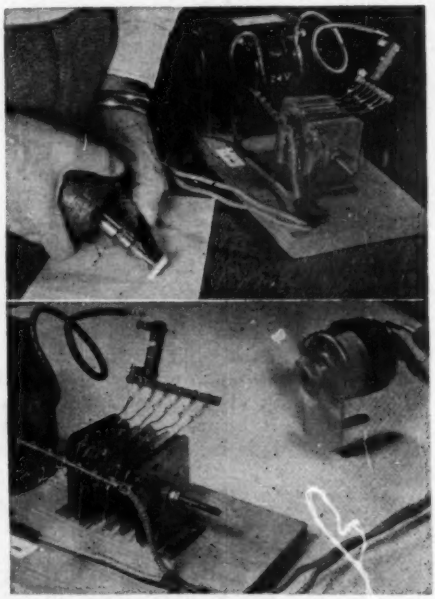
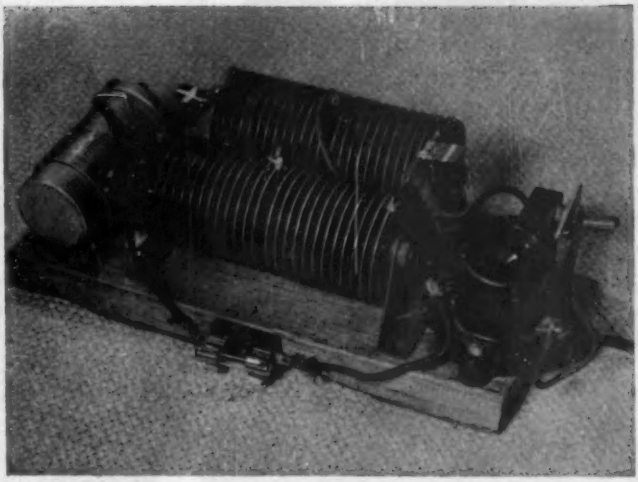


FIG. 10 BRIDGE RECTIFIER 115 VOLTS (FULL WAVE)



Surplus 24-volt aircraft motor makes a husky hand grinder when run from a half-wave rectifier. Tin-plate disks 2½" square clamped alongside the steel disks and extra spacer washers between the plates increase current capacity by 25 percent. A small cooling fan blowing on rectifier will double load capacity for brief periods.



You can run small 110-volt DC motors with this unit. Two 24-plate stacks are hooked up in a full-wave circuit (Fig. 10). The 60-mfd. capacitor improves the voltage regulation.

(Fig. 10). For 2 amp. at line voltage, add two more stacks as shown by dotted lines.

Measuring output voltage. A DC voltmeter put across an unloaded rectifier will show a lower reading than you'd expect. It will read higher when the rectifier is working at normal load. However, on halfwave DC the meter will never show peak voltage, but only the average.

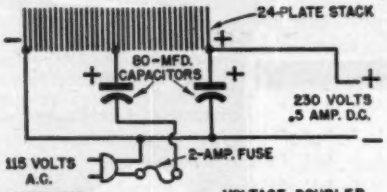


FIG. 11 VOLTAGE DOUBLER (HALF WAVE)

Less voltage drop under load can be had by connecting an electrolytic condenser across the DC output. Use a 60-mfd. condenser or larger if possible. Remember that electrolytic condensers have a plus and a minus side, and connect them accordingly.

Voltage doubler. You can get 230 volts from a 115-volt line with the circuit shown in Fig. 11. One of the two condensers is charged on half of the sine wave, and adds its charge to the line voltage on the second half. Be sure to use a 2-amp. fuse in the 115-volt side. END

WOOD-GRAIN TERMS

Close grain—Narrow and inconspicuous annual rings. The term is sometimes used to designate wood with small and closely spaced pores, but "fine textured" is more common for this.

Coarse grain—Wide and conspicuous annual rings with marked difference between springwood and summerwood.

Cross grain—Where the cells or fibers do not run parallel with the axis or sides of a piece.

Diagonal grain—Annual rings at an angle with the axis of a piece as a result of sawing the log at an angle.

Edge or vertical grain—Lumber in which the rings form an angle of 45° or more with the surface of the piece.

Interlocked grain—Wood in which the fibers are inclined in one direction in a number of rings of annual growth, then gradually reverse and are inclined in an opposite direction in succeeding rings, then reverse again.

Flat grain—Lumber in which the rings form an angle of less than 45° with the surface.

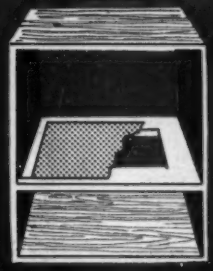
Open grain—Common classification of painters for wood with large pores, also known as "coarse textured."

Spiral grain—A type of growth in which the fibers take a spiral course about the bole of a tree instead of the normal vertical course. The spiral may extend right or left-handed around the tree trunk.

Wavy grain—Wood in which the fibers collectively take the form of waves or undulations. (From the National Lumber Manufacturers Association.)

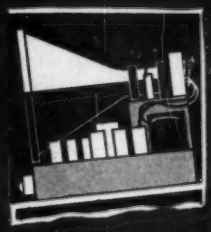
FOR YOUR POPULAR SCIENCE INFORMATION FILE

Tips for TV Cabinet Builders

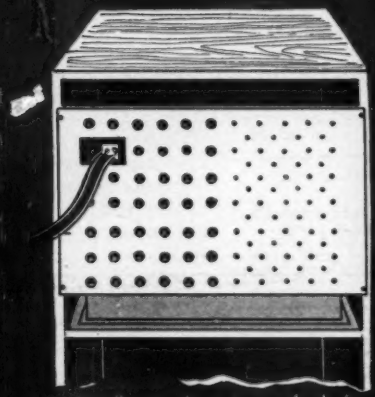


Allow for ventilation. Be sure there's air space below the shelf on which set rests. Drill holes in shelf, or, better, cut a large opening and cover it with heavy metal mesh.

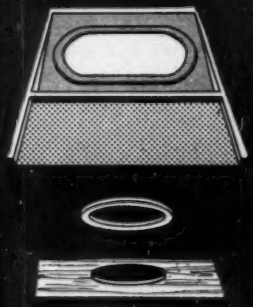
Keep parts accessible for servicing. Each unit should be removable without disturbing others. Connect units with polarized plugs and sockets.



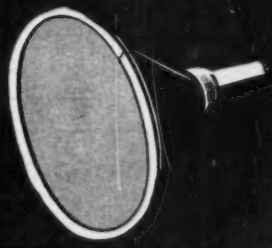
Minimize glare on picture. Tilting the chassis forward about 4° and letting cabinet overhang the picture tube at top will help to cut light reflection.



Install protective cover on back. It must combine safety with maximum ventilation; 3/8" holes will stop most flying glass. Near high-voltage circuits make holes 3/16".

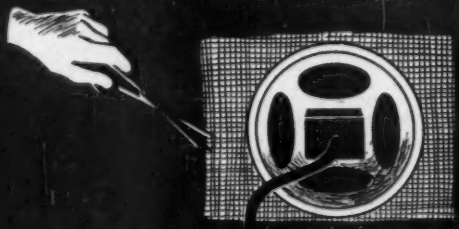


Consider viewing angles. If it won't be convenient to move chairs around the set, use a rotating base. You can buy a commercial swivel or make a ring and disk as shown.

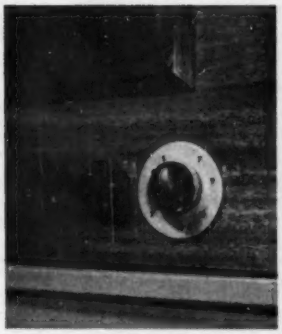


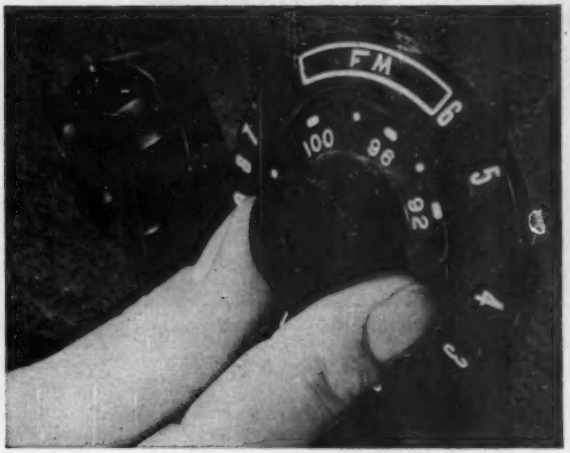
Guard against voltage leaks that may make front of set "hot." Use neoprene, not rubber, for metal-tube supports.

Shield the bottom of the set to reduce noise pickup. Easiest way is to line chassis shelf with aluminum foil and cover foil with cardboard. Connect chassis to foil. Punch vent holes through all layers.



Trim speaker-grille cloth. Most speaker cloths have metal fibers. If loose threads straggle into contact with high voltage, your set may become dangerous to touch.





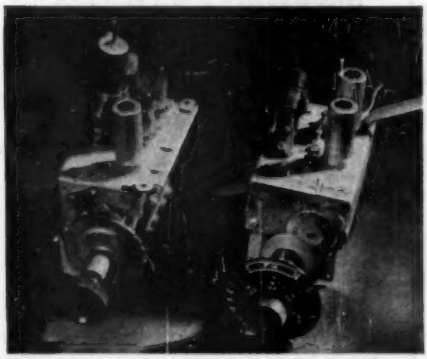
Only visible change in TV set to which the new DuMont tuner has been added is replacement of dial above by one at right. Its outer band is used for TV and its inner band for FM.

New Tuner Adds Radio To TV

You can put in this tuner and hear FM broadcasts on a video receiver. And pictures will come in better, too.

By Robert Gorman

A MILLION or more of the TV receivers now in American homes can be converted so that they can be also used as FM radio receivers. The original tuners in many of these sets are becoming worn. They can be replaced with newly available "front ends" that both bring in FM broadcasts and improve the reception of TV pictures.



Switch-type tuner (left) used in many TV sets and the new Inputuner (right) are both physically and electrically interchangeable.

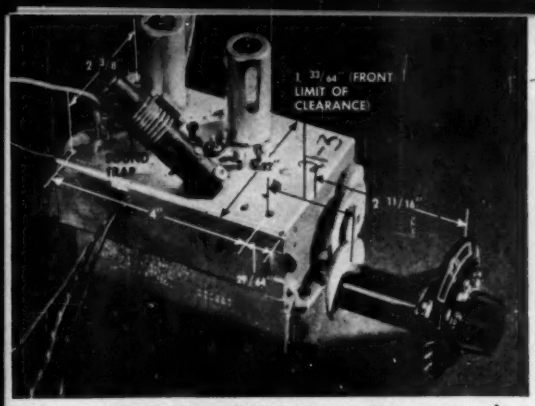
These units, the latest in the line of DuMont Inputuners, can be substituted for the switch-type tuners in most of the RCA 630-TS circuits found in about 20 different makes of sets. They can also be put into many other TV receivers that have separate intermediate-frequency circuits for pictures and sound. But they aren't recommended for sets that have "single channel," sometimes called "intercarrier," sound systems.

How about your set? To see whether the new tuner could be used in your set, first compare its dimensions (given on the next page) with those of your present tuner. Then consult the manufacturer's service manual. If your receiver has an intercarrier sound system, you will not find more than one sound IF stage on the diagram, but if it is a dual-channel receiver the diagram will show two, three, or more tubes labeled "sound" or "audio" IF.

Another important item is the sound IF frequency. Various ones have been used in different sets. Replacement Inputuners are made for two of the most common IF sound frequencies: 21.25 and 21.75 mc.

How it's installed. Installation of a new tuner is not difficult. Remove the chassis and loosen the screws that hold the old tuner in place. Snip off the flat ribbon lead-in wire that runs to the tuner from the antenna-input terminals.

Turn the chassis over and trace, with the



Check these dimensions against corresponding ones on your present set and tuner. Some models of the new unit do not have sound take-off trap.

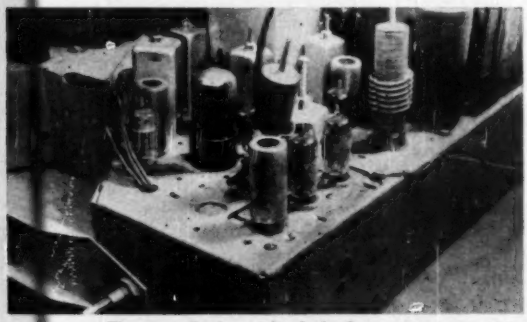
help of your diagram, the five leads that connect the tuner to the other circuits. Note where each wire ends and then unsolder the lead. If you can't reach it with a soldering iron, snip the lead, leaving an inch or so of wire. You'll then be able to splice a new wire to the old one.

One lead goes to B-plus, another feeds the 6.3-volt heaters, and a third connects to the grid of the first sound IF amplifier. A bare wire coming through the back of the tuner goes to the grid of the first video IF tube. It must be kept short. A fifth wire is supposed to feed into the AGC (automatic gain control) circuit. Some sets, including the original versions of the 630, do not have AGC. The procedure, however, is the same; just substitute this lead for the fifth connection of the original tuner. In the 630 it goes to the diode plates of the first audio amplifier, a 6AT6.

When you've restored the twin-lead connections to the antenna terminals, you are ready to tune in your new TV-FM combination. Replace and connect the picture tube and adjust the ion-trap magnet for the brightest raster (scanning lines at an unoccupied channel). Make sure that there are no shadows at the corners of the raster.

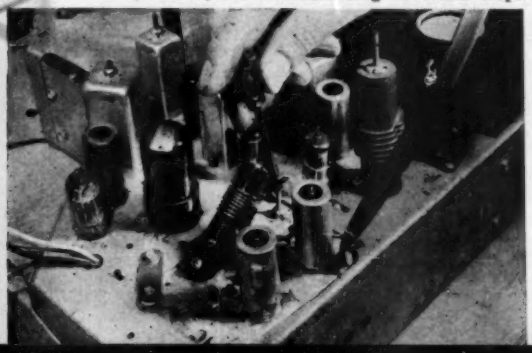
Final adjustments. You should get good picture and sound immediately, but a couple of touch-up adjustments may sharpen them both. The alignment points are the grid-coil adjustment (see photo) and the slug in the sound trap. Undoubtedly the best way is to align them with a signal generator and a vacuum-tube voltmeter, but it should be possible to peak them pretty well by turning the adjustment screws and looking and listening very carefully. Don't touch any of the other slugs.

And don't be satisfied with pictures that are only just as good as before. This tuner has about twice the gain—especially on the high channels—of the models it replaces. It also should do a better job of rejecting unwanted signals. END



Tuner sub-chassis is bolted to cut-out in main chassis. Before removing unit, identify wires coming from it with aid of circuit diagram.

Slight adjustment must be made to peak the video and sound. Adjustment points are grid coil, shown, and movable slug in sound trap.



They're steel workers. A porcupine is a revolving cylindrical rack for cooling and inspecting galvanized sheet steel.

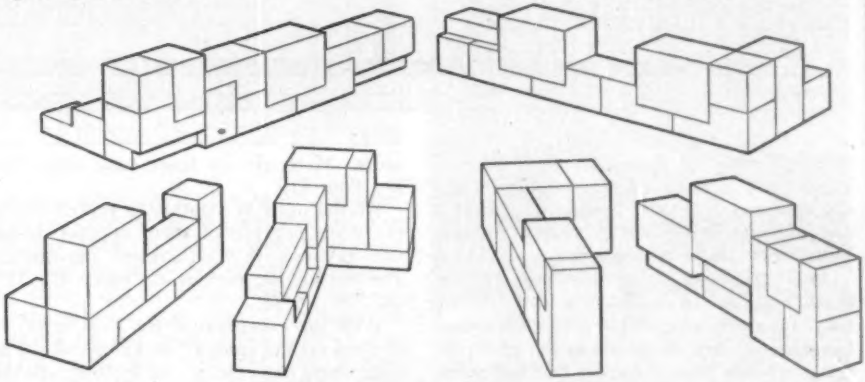
Storage Units You Can Move

They're easier to rearrange than furniture—and anyone can build them.

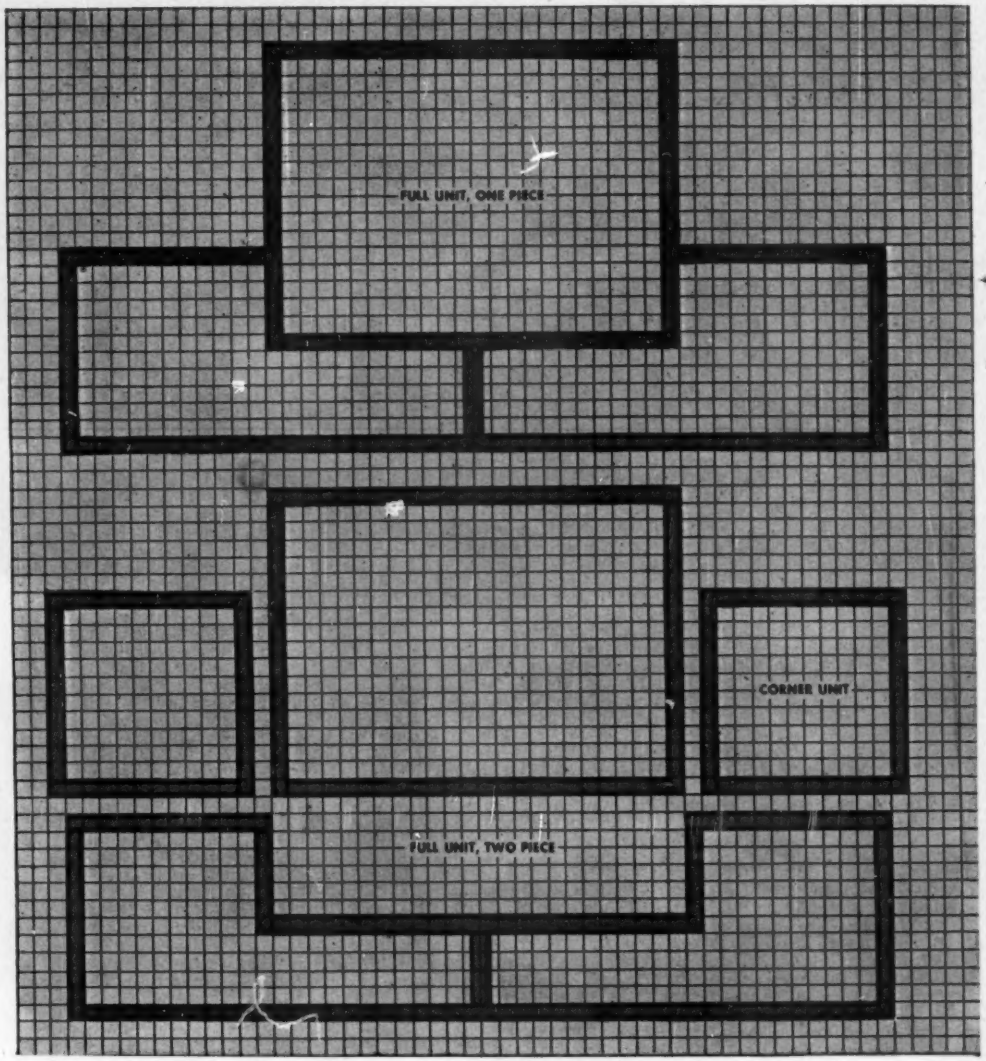
By Roland Cueva

BUILD your shelves for magazines, books, records, and knickknacks this way and you'll have solved one storage problem for life. If your wife rearranges the furniture, shelves can be made higher, lower, shorter, or longer by simply stacking them up differently. No landlord will object to such movable walls. And when you move, you can take them with you.

You can turn out a complete set with only hand tools if you make the full units and



New arrangements are almost unlimited since units will fit together in many different ways.

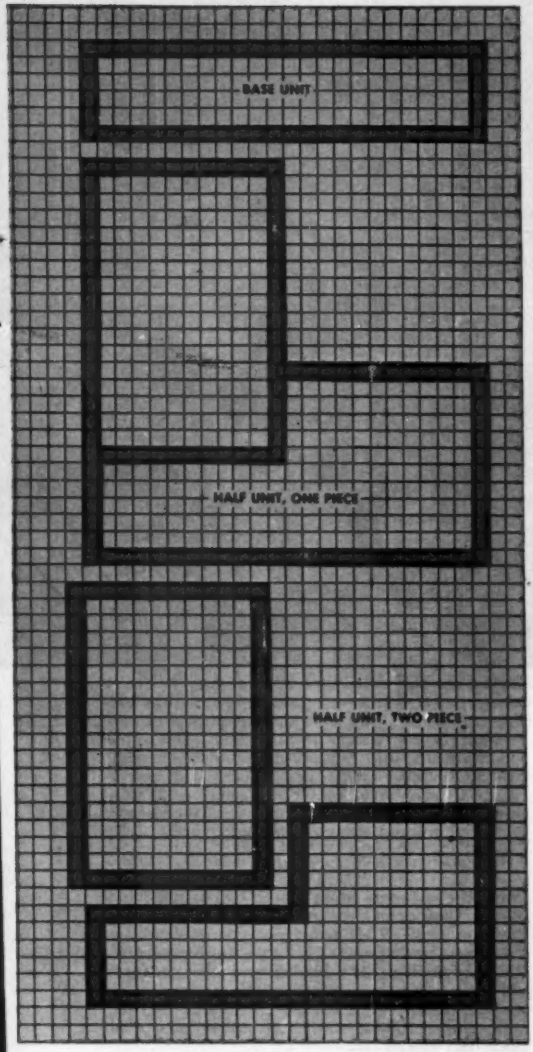


the half units as two-piece jobs. If you build them as single pieces, you should use dadoes, and this will generally require a circular saw. Otherwise, all joints are simple butt joints nailed and glued.

Build as many or as few units as you need. You can always add new ones because they are extremely simple and inexpensive to make. In the set shown in the photo on the preceding page there are two full units, one half unit, two corner, and four base units. Materials for these nine units cost less than $10.

All the units fit together in several different ways because of their stepped design and because of standardized dimensions. The outside dimensions are either 6″, 12″, 18″, 24″, or 48″.

With the exception of the base units, all of them are cut from 1″ by 12″ planks. The base units, made from one-by-tens, are the only units that have backs, which can be



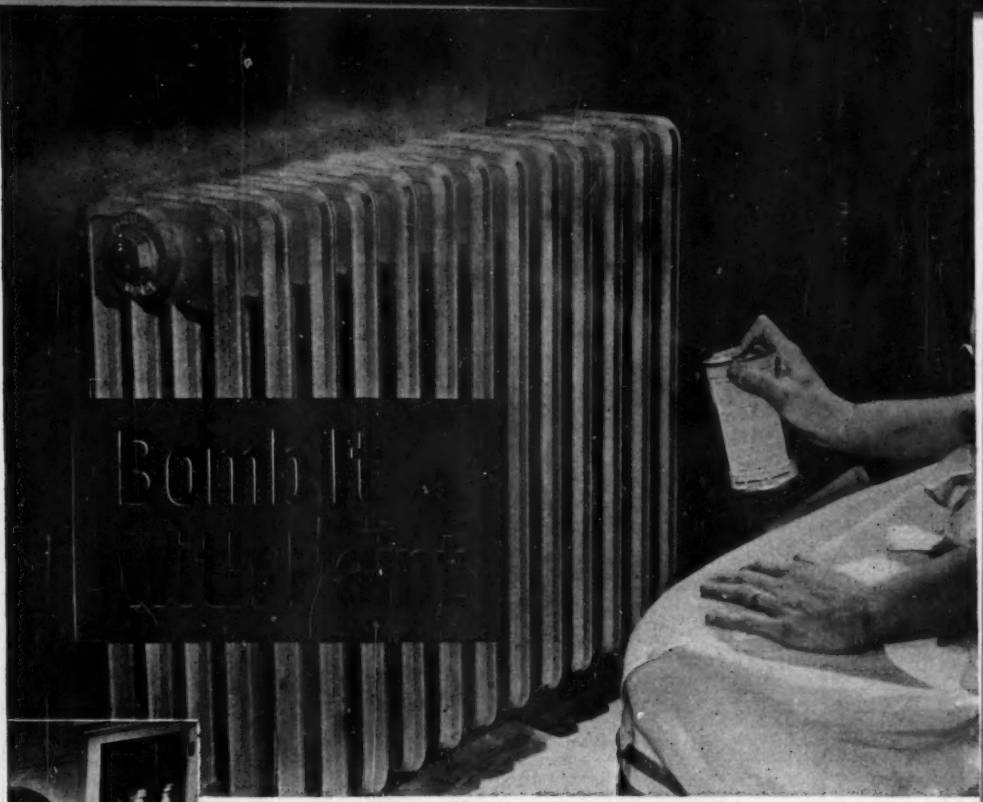
Top pieces of full unit's outer section fit in dadoes of center section. In photo above, bottom divider piece is being nailed in.

Plywood back is being attached to base unit with small wire nails. This unit—2" narrower than others—is only one with a back.

Completed units are shown below. Nail heads were countersunk and filled over with composition wood. These units were enameled.

cut from ¾" plywood. The bases—narrower than the other units—are designed to give you toe space. However, with their open sides out, the bases can be used on top of the other units for more storage room.

Second-grade pine (No. 2 common) is all right for the units if you take care to fill the cracks, sand well, and apply a good undercoater before final painting. Clear pine is best, of course, but it costs about double the No. 2 grade. END



You can store spray paints in a kitchen cabinet. They take up little space and aren't messy and smelly like partly used cans of ordinary paints. But don't put them where they'll get too hot.

Dress up the radiators in your home with a spray paint. Painting radiators with a brush is a messy, tedious job. But with a spray pack you can do the job cleanly and quickly. Place cardboard behind the radiator to protect the wall, cover the floor with newspaper, and you're ready to start spraying. For wrought-iron railings, metal lawn furniture, and wire fences and gates, aluminum spray does a good job.

Stop oxidation of your copper screens by coating them with clear plastic spray. Oxidation of copper screens often causes ugly, streaky stains on the wooden siding of a house. First clean the mesh by dusting and washing. Stack up three or four screens and spray them. Keep the spray moving at all angles to cover all surfaces of the wire. Then turn the screens around and spray them from the other side.

Save the shine on brass fittings by coating them with transparent plastic spray two or three times a year. This spray also is excellent for tools and ferrous-metal surfaces to prevent rust. Use it on ice-skate blades and sled runners when you put them away for the summer. Use it, too, to preserve handles of tennis rackets, golf clubs, fishing rods, and other pieces of sporting equipment.

Now you can turn out professional spray-paint jobs—and without laying out a lot of money for a spraying outfit.

By Bernard Gladstone

PS PHOTOS BY W. W. MORRIS

PUSH-BUTTON painting is easy. It's fast and neat, too, and when you're finished there are no brushes to be cleaned.

The new paint bombs now available (PS, Dec. '50, p. 102) work best on small objects and things that have many sides or curved surfaces—such as wire grilles, toys, machinery, lamp bases, tools, radiators, and wicker furniture.

You may find it difficult to get an even, glossy coating on a large, flat surface because the nozzles of the cans are not adjustable. But if you're careful, you can paint almost anything with spray packs.

Heed These Tips

Always shake the can before starting and every few minutes while using it. Shaking activates an agitator in the can and keeps the paint from settling.

Do your spraying in a room where the temperature is at least 70° F.

Hold the can at the right distance from the work—10 to 14 inches, depending on the maker's instructions. Holding it closer will cause the paint to pile up and run. Holding it farther away will give you an uneven finish.

Hold the can at the same distance from the work all of the time. Swinging the can in an arc will bring the nozzle closer to the work at the center of the arc than at the ends.

Always start spraying beyond the edge of the work, and carry the can beyond the opposite edge before stopping. This will prevent one spot—especially the edges—from getting too much paint.

For an extreme change of color, use two coats. Let the first coat dry 6 to 8 hours.

Don't stop moving the can while you are spraying.

Don't spray in drafts or outdoors unless the air is still. The spray is extremely fine and the slightest breeze will blow it.

Don't use the can around open flame.

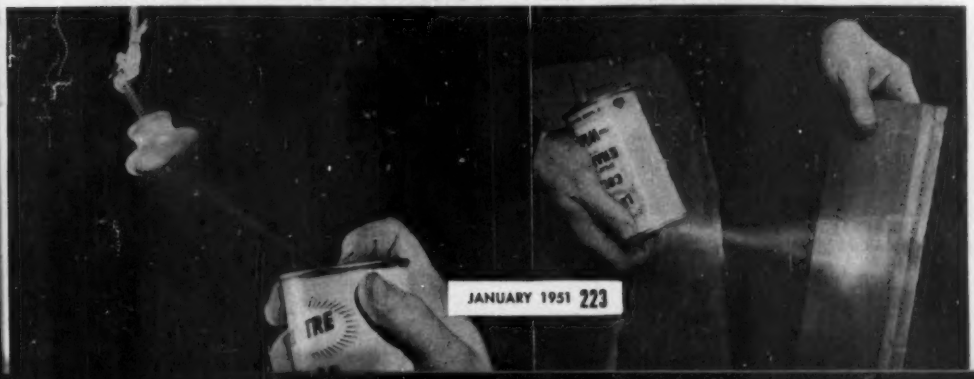
Don't throw used containers in a fire. They may explode.

Don't puncture a container. It may explode and you will get a face full of paint and perhaps pieces of the can. END

Mask off parts of your work when doing a two-color job. Here the drawer pulls are being sprayed a darker color than the drawer fronts. Masking tape and newspaper keeps the darker color off drawer fronts. Let the paint dry completely before pulling off the tape.

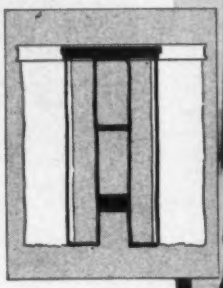
Spin it and spray. By using this simple trick you can quickly and evenly cover all sides of a small object. Tie one end of a string to an overhead beam and the other end to the object. Wind up the string 20 or 30 times and let it go. As the string unwinds, it spins the work while you spray it. This method is easier and neater than holding the object in your hand and twisting and turning it as you spray.

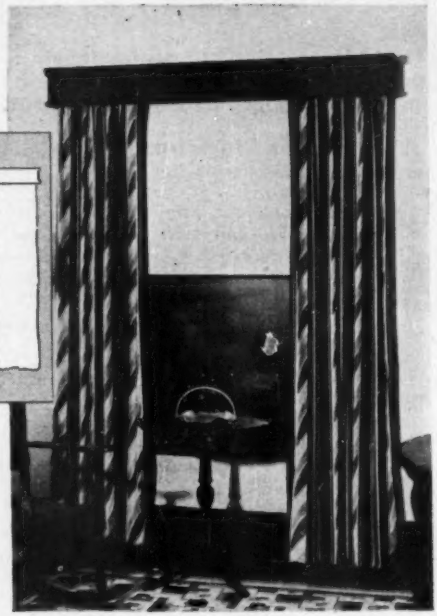
Clear the nozzle after you've finished spraying. Turn the can upside down and give it several short blasts. This clears the fine nozzle opening of the last few drops of paint. If you don't do this, paint will harden in the nozzle and you may find your spray pack useless the next time you try to use it. If the can you have is normally used upside down, turn it right side up to clear the nozzle.



No squawks from the landlord with valances like this. When you take them down, they leave no visible trace and can be used elsewhere.

Invisibly Held Valance Modernizes Old Windows



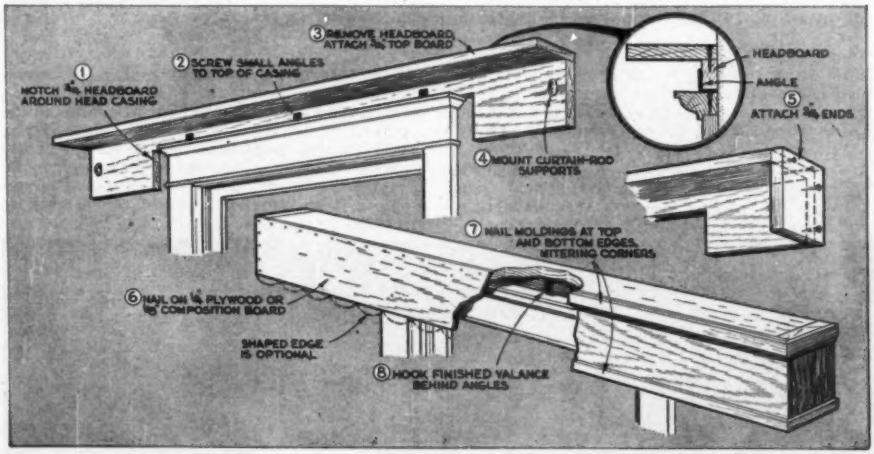


VALANCES can give you a modern wide-window effect even though your home has narrow windows. Simple to make with hand tools, the valance shown spreads drapes to twice the width of the window frame. It can be removed instantly, leaving no unsightly holes in walls or casing. Should you move, it can be made to fit other windows that vary as much as a foot in width from the one it was built for.

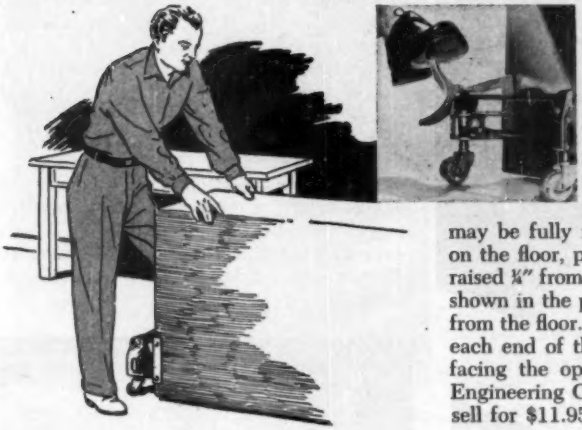
Make the valance 5″ deep, 6″ high, and about twice as long as the window is wide. This gives ample room for curtain rods or drapery hangers. Instead of the simple modern style shown, you can scallop or otherwise shape the face board, omitting one or both lines of molding.

It's best to fasten the sides and top to the back board with screws rather than nails. This makes it easy to disassemble the unit for replacing rods or hangers or enlarging the notch to fit a bigger window. Where nails are used, sink and putty over them and sand well before finishing.

Two or three small angle brackets are screwed on top of the window casing, where they don't show. The valance is simply hooked behind these and can be lifted off at any time.—*Michael Ligocki, Gary, Ind.*



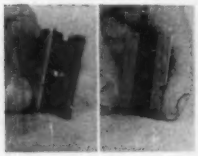
New Bench Casters Raised or Lowered by Foot Power



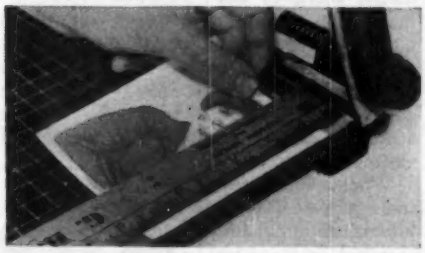
Press, it's locked. Press again, it's released. Easy foot action turns the three-pronged lever to raise or lower casters on this assembly. Designed for use on benches or machine stands, it has cam stops that lock in three positions. The casters may be fully retracted with the bench legs on the floor, partially lowered with the legs raised ¼" from the floor, or fully lowered (as shown in the photo) with the legs raised ½" from the floor. One assembly is bolted inside each end of the bench with the foot levers facing the operator. Made by the Magna Engineering Corp., San Francisco, the units sell for $11.95.

Storing Razor Blades Safely

SAFETY-RAZOR blades are useful for many cutting jobs around the house and shop but are dangerous to keep about with the blade uncovered. The single-edged type, fitted together as shown, may safely be kept in a drawer or carried in a pocket. Just press two blades together with the cutting edge of each inserted under the metal back strip of the other.—*John J. Rea, Urbana, Ill.*



Straight Edge Makes Trimming Easy



A RULER thumbtacked to your cutting board will help you cut even borders on contacts and enlargements. Press in the tacks, then pry up the ruler just enough to allow you to slip prints underneath. When trimming, align the masked edge of the photo with the ruler. You can determine the border width by adjusting the distance between the ruler edge and the cutting edge.

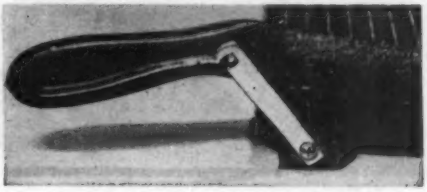
Flashlight Makes Darning Light

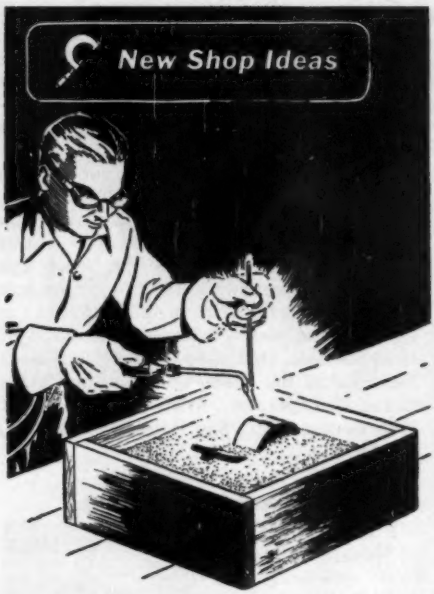
I HAVE found that a flashlight serves more efficiently for darning than a darning egg. When the light is on, it shines through, illuminating the work and lessening eye strain.—*H. Leeper, Canton, Ohio.*

Catch Holds Cutter Blade Down

IF YOUR print trimmer has a spring-action knife, making the raised blade a hazard when the trimmer is idle, you can easily add a safety catch to hold the blade down.

You can make one of a bit of strip metal, but it is easier to use a long mending plate or one leg of a flat angle plate that is already drilled with a hole for screwing the catch to the trimmer base. File a notch in the opposite end. Drill a hole in the trimmer handle to take a short bolt and retaining screw. Then screw the catch to the base of the trimmer, draw down the handle, and slip the notched end over the protruding bolt.—*Roland Wolfe, Palo Alto, Calif.*

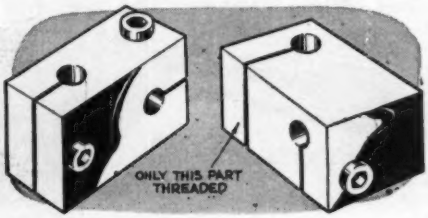




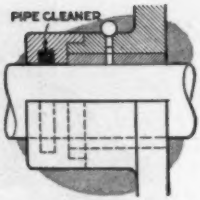
Sand Holds Welding Job. Parts that won't lie flat, or because of the way they are broken won't support themselves, can be held in position for welding in a sandbox. For small jobs, a box 6" deep by 18" square will serve. Put in 5" of thoroughly dry, fine sand. Wet sand may spatter and should be avoided.

Work the parts down into the sand with the break areas in contact. A tack weld will hold them together; then you can remove them from the box to finish welding in any convenient position.

One Bolt Clamps Two Ways. Split blocks for clamping two rods at right angles or for mounting instruments on uprights are usually made as at the left below. By slotting them from one face and one edge as at right, you can use a single long bolt to pinch both holes. This leaves one hand free for positioning parts, while the other tightens the clamp. *—Frank M. Butrick, Jr., Alma, Mich.*



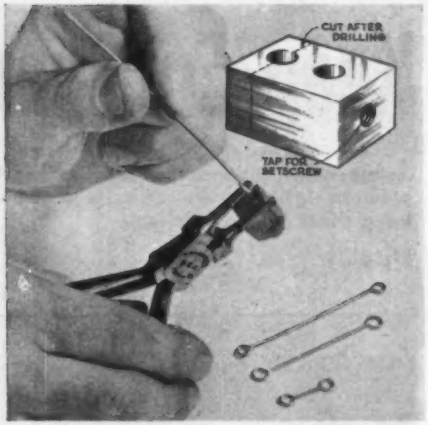
Pipe Cleaner Seals Out Dust. An ordinary pipe cleaner makes a good substitute for a felt dust seal around a shaft. Wind the cleaner around the shaft and cut it to length. It will spring out with enough tension to hold itself in the groove. If two or more cleaners are needed, stagger the butted joints. The short fibers, perpendicular to the shaft surface, form an effective seal.*—Edward P. Meyer, Champaign, Ill.*



Lathe Weights Cast in Cans. The vibration set up by heavy, off-center work wears lathe bearings and makes accuracy impossible. Such jobs should be mounted with counterweights. Those shown below are cheaply and easily made by pouring lead to a number of different depths in tin cans of various sizes.

When cold, the castings are removed, bored, mounted on a mandrel, and turned down to the desired weights. It's well to cast a few extra and leave them on hand to turn down as needed. Mount weights with square-head bolts your toolpost wrench fits.*—W. Thomas, Buffalo.*

Drill Jig of Hex Stock. A jig's the thing for drilling cross holes accurately in a number of pieces of round work. But a jig made of flat or square stock calls for accurate layout and machining, scarcely warranted for short runs. Use hex stock, which is easily centered in the three-jaw chuck for drilling the main hole in which the work goes. The only critical job is centering the cross-drilled hole on one flat. Tap a second hole for a clamp screw to lock the work.—*Floyd McGuckin, Ridgewood, N. J.*

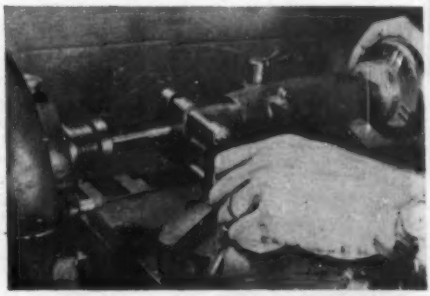


Forming Perfect Loops. If you often have to form neat looped ends on wire, it will pay you to make the block above for use with round-nose pliers. It shapes perfect loops easily and quickly. Drill two holes through a small block of steel as shown in the drawing. If you have a taper reamer to match the taper of the pliers, ream them both before cutting the block. If not, cut the block first and shape the holes with a rattail file. Tap the end for a setscrew to hold the block on.—*John J. McGuckin, Ridgewood, N. J.*

Speed Wrench Tightens Chuck. A real timesaver when you have to chuck many pieces of different diameters is a wrench made from a cheap brace or a speed handle. Simply saw off the end or socket and file or mill the tip to fit the wrench opening in the chuck screws. —*Walter E. Burton, Akron, Ohio.*

Oil-Level Telltale. A machinist friend gave me this tip on how to tell the amount of oil in oil cups at a distance. Shape a small ball from a piece of cork and coat it with red fingernail polish. Dropped in the oil cup, it's a highly visible telltale even from some feet away. —*William B. Eagan, Louisville, Ky.*

Knurling Small Stock. In knurling small diameters with a hand tool, the method shown at right will minimize the tendency of the work to bend, and keep the tool square. Clamp the tailstock close to the end of the work and run the empty ram up against the knurling tool. Then start the lathe, feeding the tool along by the tailstock handwheel. As the work is knurled, it runs into the hole in the ram. A length equal to the ram travel can be knurled in this way. —*Henry Sevcik, Los Angeles.*



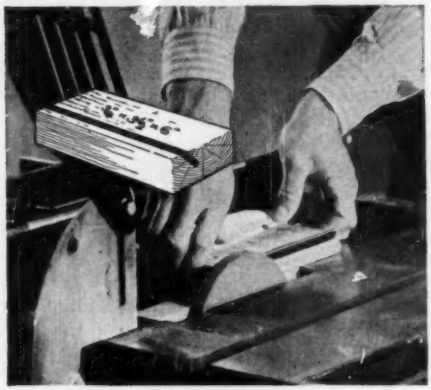
Keep 'Em Sharp

Jointers and shapers do their best work when their blades are keen. Here's how to keep them in tip-top shape.

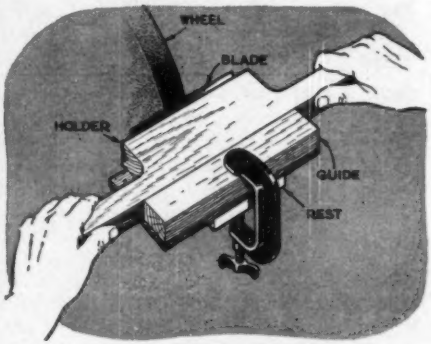
By Edwin M. Love

JOINTER blades cutting 4,200 shavings and shaper edges taking 10,000 bites a minute eventually get dull. Putting them in shape, however, is not difficult. It is a job, moreover, that yields considerable satisfaction.

Use a flexible-type abrasive disk wherever possible. In most cases you will not be able to use a guard on your circular saw. Wear goggles to protect your eyes and stand to one side when feeding the work into the disk.



Jointer blades can be sharpened on a medium-grit grinding wheel mounted in a circular saw. Mount the blade in a slotted wooden block. One or two passes on the circular saw will cut the slot, which is made with the table or arbor tilted to the bevel angle. The slot should be snug enough to grip the blade firmly. Force the blade in by hammering on a block held against the blade's edge. Set the fence so the edge of the blade barely touches the side of the wheel. Make single quick passes across the wheel. Feed the blade to the wheel by inserting slips of paper between the block and the fence. Air-cool blade between passes. After grinding, hone blades with oilstone to remove burrs.

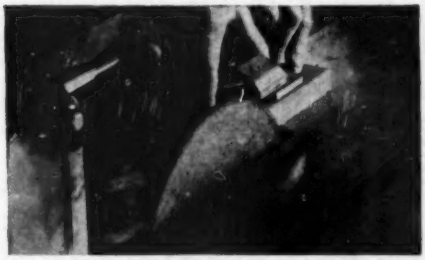


Bench grinder also can be used to sharpen jointer blades, as shown in the sketch above. To avoid burning the blade, take the lightest possible cuts and air-cool the blade between passes. The tool rest can be adjusted to the correct clearance angle.

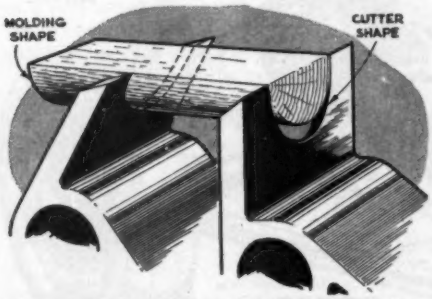
When replaced in the head, the edges of jointer blades must be parallel with the table and equally high. Clamp the blades lightly in the head and tap them down *(left)* with a block laid on the rear table. When all are positioned, tighten the retaining screws. Be sure the ends of the blades are carefully set and locked even with each other.

Whetting the blades as shown below will serve if they are only a little dull. Lower the infeed table well below the blades. Slightly lower the outfeed table until a straightedge laid on it bears across the entire face of the bevel. Lock a blade in this position by wedging the pulley with a tapered piece of wood. Wrap part of an oilstone in paper to keep it from scratching the table. Whet the blade with circular strokes, working from end to end. Count the strokes. When the edge is sharp, whet the other blades, giving each one the same number of strokes to wear down all the blades alike.

Shaper cutters can be sharpened with a fabric abrasive wheel mounted in a circular saw. The cutters are carried in a slotted block that is slid against the fence. Only the inner face, not the bevel, is ground. The wheel is tilted to match the rake angle. Because the wheel is springy, three or four passes can be made before you have to feed the block toward the wheel. After grinding, touch up the edges with a slipstone to get rid of the resulting feather edge.

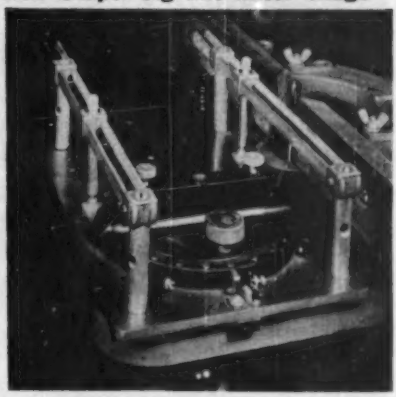


Straight cutters can be sharpened when pressed in a block that is slotted at an angle. Slide the block against the fence, grinding on the bevel. Make the same number of passes for each edge, or the blades will vary in length.



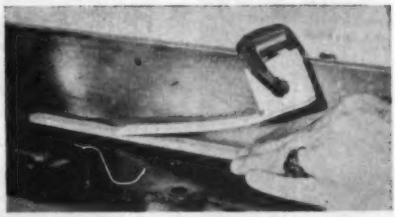
Because of the rake angle, the cutting edge of a molding cutter is not the same shape as the molding it will form, as shown in the sketch above. Remember this when selecting a cutter or grinding one to a special form.

New Shaper Jig Has Miter Gauge



THIS jig—said to be to a shaper what a miter gauge is to a circular saw—is offered by the Delta Power Tool Division, Rockwell Manufacturing Co., Milwaukee. It's designed especially for returning molding on narrow stock, shaping the ends of narrow pieces, beveling square stock, and so forth. Securely clamped by hold-downs, work is fed without danger of slipping, and your hands are kept safely away from the cutter. The gauge has quick-set stops.

Spring Improves Jointer



THIN strips of wood usually have a tendency to flex up from the knives of a jointer, resulting in an uneven cut. A wooden spring—like the one shown above—takes care of this problem and also keeps your fingers away from the cutters. It's a wooden strip ¼" by ¾" by 7" nailed and glued to a ¾" by 1½" by 1½" block. Clamp the block to the fence so the end of the strip is very close to the knives. In the photo the blade guard was removed to get a clearer view of the spring. It's not necessary or advisable to remove the guard when using the spring. —*Tom Griberg, Moline, Ill.*

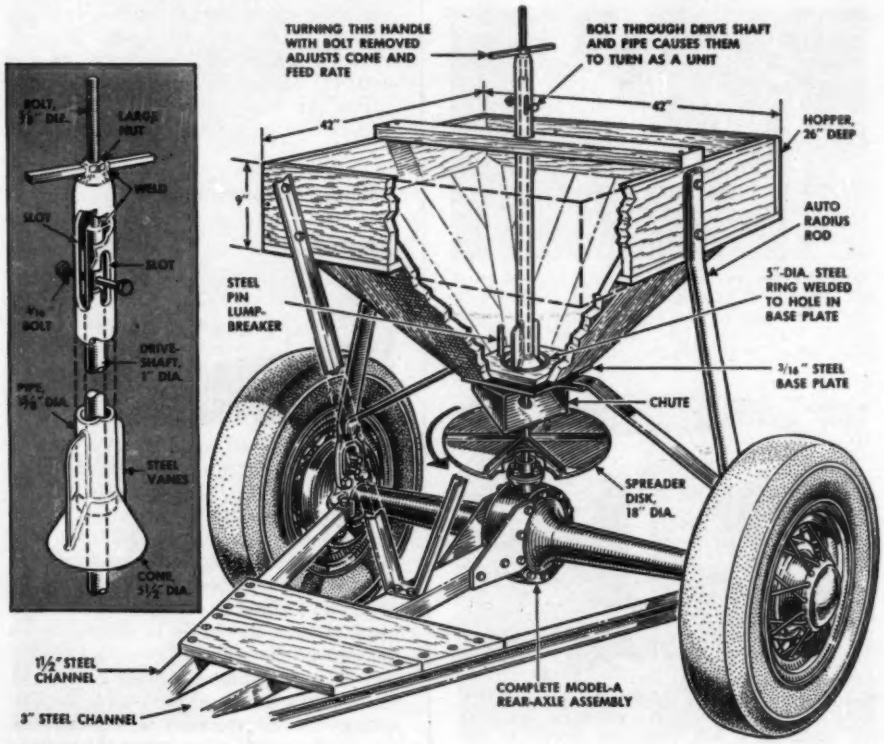
Model-A rear-axle assembly forms the chassis. Here, builder Howard Jenkins shows how the operator can ride on drawbar platform in field.

Model-A Now Spreads Lime

TO BUILD this lime spreader, a New Hampshire farmer salvaged the complete rear-axle assembly from a Model-A Ford and swung its propeller shaft straight up. In the car, the shaft drove the wheels. In the spreader, the wheels turn the shaft. A webbed disk welded to the shaft broadcasts lime over a path about 10 feet wide as a tractor tows the spreader.

Lime can be fed at varying rates by raising or lowering a sheet-metal cone on a pipe that encases the drive shaft. The pipe is welded to a large nut that turns on a ⅝" bolt welded to the end of the cut-off drive shaft. A lock bolt causes the pipe and cone to revolve with the shaft.

A chute screwed to the hopper base delivers lime to the disk. Swung vertically, the Ford radius rods help support the hopper.—*Charles L. Stratton, Hollis, N. H.*



Stopper Serves as Grinding Head

You can make a practical grinding and polishing head for a drill or motor chuck from a No. 6 rubber laboratory stopper. Force the stopper over a short length of ¼" rod and chuck like a twist drill. From abrasive paper, cut out and glue together conical shells to fit the stopper. Be sure to overlap the edges so that rotation won't open the seam. The taper of the stopper will hold the shells firmly, but they can readily be changed—*J. G. Schad, Pittsburgh, Pa.*

Need a Clamp for Small Parts?

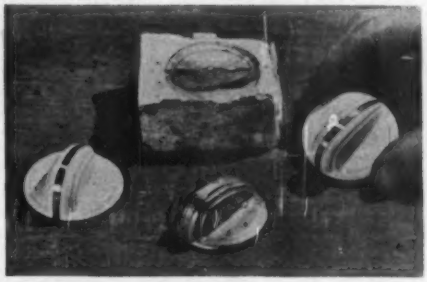
Have you ever thought of using a trouser hanger as a handy clamp when you are gluing up small pieces?—*Mrs. S. Sorensen, Mira Loma, Calif.*

Plastic Keeps Ink Stopper Free

Stoppers of India ink bottles tend to stick and eventually break off in the bottle. To prevent this, cut a disk of vinyl sheeting about 1¾" in diameter. Punch a hole through the center of the disk and slip the stopper through it. Vinyl plastic is highly resistant to both acids and alkalies and also can be used to protect corks used in bottles of soldering flux, ammonia, and many other chemicals that are commonly used about the shop. —*Andrew Brennan, Philadelphia.*

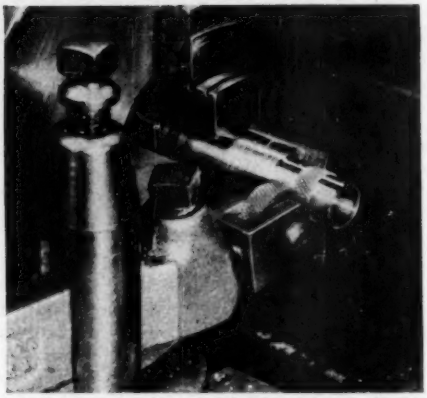
Match Your Knob in Lead

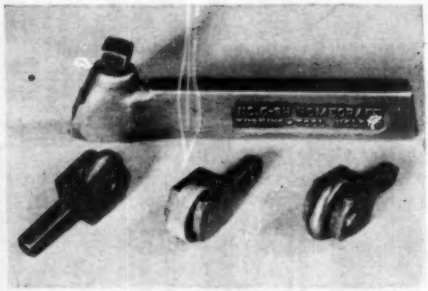
If you can't match that broken knob on your stove, cast a new one yourself from lead. Using one of the remaining knobs as a pattern, make a plaster of Paris mold. Oiling or greasing the knob will make it easy to remove it from the hardened plaster. When the mold has dried thoroughly, use it to make a lead casting. File off any roughness, drill the necessary mounting holes, and finish the casting to match the original knob. A lead casting as it came from the mold is shown at center in the photo below. The knob, after finishing, is shown at right. Tin-can stock furnished the metal trim.



Dust Dims Image on TV Screen

Dust that settles and bakes on the face of the image tube steals life and brilliance from the picture. To keep your TV picture bright, keep the tube face clean. Take off the safety mask and wash the tube face with a damp cloth or window cleaner. Wipe it with a soft, lintless cloth. Do the same to the inside surface of the safety mask. If you can't easily remove the mask, chances are that the tube is protected by a built-in dust shield and doesn't need cleaning.



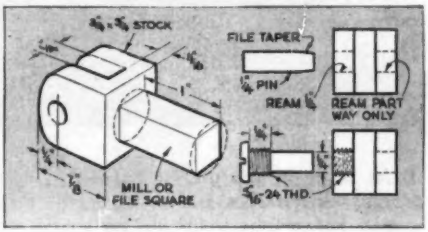


Replacing the tool bit, these individual knurling wheels can be mounted in a moment. Above are shown two types of knurling wheels and a homemade metal-spinning wheel. The latter has seen hard service on short production runs.

Individual Knurling Tools Inserted Like Bits

WITHOUT once changing tool holders, you can switch from turning to knurling and back again by inserting these individual knurl holders. For the price of a single wheel of each kind, you can do every kind of knurling. A wheel with a radius on its edge, turned from drill rod and hardened, does a good job of metal spinning.

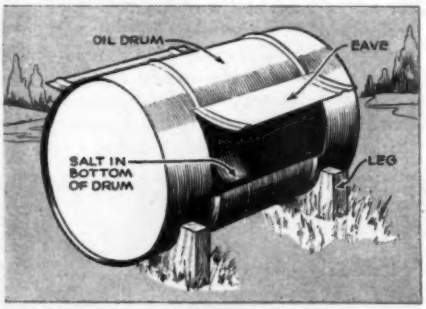
To make each holder, chuck a 2" length of ¾" square steel in the four-jaw and turn it down to ¼" about halfway. Remove it from the lathe and mill or file this portion square to fit a tool-holder socket, making the sides parallel to the ¾" ones.



Drill a ¼" hole near the bottom of the slot. Saw to it and file out the slot clean and square. Drill the cross hole undersize and ream to ¼" just short of its full length. Cut the pins from drill rod, file a short taper at one end for a drive fit in the **hole,** and harden. Polish the pins and reheat to draw the temper to a deep straw color at the center, where the wheels ride.

If you want to make wheels interchangeable in one holder, turn the pins with a threaded shoulder to fit a tapped hole in one side of the holder fork.—*Floyd McGuckin, Ridgewood, N. J.*

Oil Drum Holds Salt for Sheep



AN OIL drum with openings cut on opposite sides makes a handy portable salt trough for sheep. Screw the drum to blocks as shown or weld on angle-iron legs.

Broom Squared on Circular Saw

BROOMS that have become lopsided from wear can be squared off easily on a circular saw. Cut two pieces of wood 3" or 4" wide and about 4" longer than the broom's width. Cut two small pieces about 1" or 1¼" thick for spacers. Lay the broom on one of the long pieces, place spacers on either side of it, and top with the other long piece. Nail through the three pieces at one end. Push up the other spacer to compress the broom firmly and then nail through. Nail on outer edges only. Set the blade so it cuts into but not through the top piece.

YOU'LL HAVE A WHALE OF A GOOD TIME MAKING YOUR OWN PRINTS

. . . with a new Kodacraft Outfit

Perfect for the beginner—Kodacraft Printing Kit . . . easy-to-follow directions for making your own prints. Packed in suitcase-type carton.

3 5x7 Tenite Trays in black, gray, and red. Nubs on bottom provide rocker action for agitation.
1 Kodak Printing Frame
1 Kodak Mask Chart for Kodak Printing Frame
1 25-sheet package of 2½ x 3½ Kodak Velite Paper for printing under daylight conditions
1 Kodak Tri-Chem Pack
1 Graduate
1 Kodak Darkroom Thermometer
1 Kodak Glass Stirring Rod
1 Complete Instruction Book

Everything you need to develop and print—Kodacraft Photo-Lab Outfit . . . includes new Kodacraft Roll-Film Tank. Suitcase-type carton for handy storage.

1 Kodacraft Roll-Film Tank with 620-120 roll-film apron
3 Rocker-type 5 x 7 Tenite Trays
1 Kodacraft Printing Frame, 4½ x 5½
1 Kodacraft Print Mask Set
1 25-sheet package of 2½ x 3½ Kodak Velite Paper
2 Kodak Tri-Chem Packs
1 8-oz. Plastic Graduate
1 Kodak Darkroom Thermometer
2 Kodak Junior Film Clips
1 Complete Instruction Book

A complete outfit, including metal printer and roll-film tank—Kodacraft Advanced Photo-Lab.

1 Improved Kodacraft Metal Printer . . . 2 Center-opening Kodak Ruby Printing Masks for 2¼ x 3¼ and 2¼ x 2¼ negatives . . . 1 Kodak Mask Chart . . . 1 Kodacraft Roll-Film Tank with 620-120 roll-film apron . . . 3 Rocker-type 5 x 7 Tenite Trays . . . 1 25-sheet package of 2½ x 3½ Kodak Velite Paper . . . 2 Kodak Tri-Chem Packs . . . 1 Kodak Darkroom Thermometer . . . 1 Graduate . . . 2 Kodak Junior Film Clips . . . 1 Kodak Glass Stirring Rod . . . 1 Brownie Darkroom Lamp, Model B . . . 1 Complete Instruction Book

Prices are subject to change without notice and include Federal Tax

YOUR KODAK DEALER WILL BE GLAD TO SHOW YOU THESE KODACRAFT OUTFITS

EASTMAN KODAK COMPANY, ROCHESTER 4, N. Y.

Kodak

PYROIL is a "must" with low viscosity oils

You're perfectly right to use low viscosity oils for winter driving. It helps you to "easy starts". But the running temperature of your engine is the same winter and summer. That's why Pyroil is the perfect companion for winter oil. When your car is standing in the damp and cold, winter oil quickly drains off, exposing piston rings and cylinder walls to excessive rust and corrosion. Pyroil causes even low temperature oil to cling to exposed metal surfaces. This prevents scoring due to pumping, damaging "dry starts"—costly wear and tear. Pyroil keeps winter lubrication at a summer level.

Add Pyroil to winter oil—add miles to your car.

Pyroil for Aircraft Engines

Use Aircraft Pyroil B for lubricating oil, Aircraft Pyroil A for gasoline.

GIVEN! An attractive Pyroil metal savings bank—takes coins up to 50c pieces. MOTORISTS, it's yours for the asking—sent postage paid.

Manufactured and Guaranteed by
PYROIL COMPANY,
531 Main Street,
La Crosse, Wisconsin.

Canadian Distributors: Central Purchasing Agencies, Ltd., Toronto, Ontario

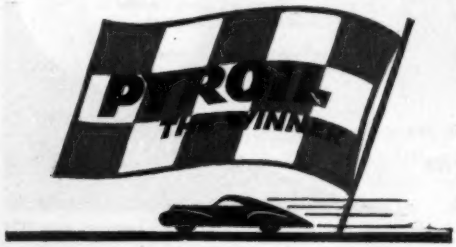
PYROIL COMPANY
531 Main Street, La Crosse, Wisconsin

I want my car to last and run properly. Please tell me more about Pyroil and how it can accomplish this for me.

Name.....

Address.....

City or Town.....*State*.....



Gus Tames a Runaway Engine

[Continued from page 184]

from his motor. He maneuvered the coasting car to the shoulder of the road, and, almost before the car had come to a stop, Gus was out, had the hood up, and was directing the beam of the flashlight at the engine. Just as Jim joined him, there was a click and Gus noticed that the throttle rod to the carburetor snapped back into what was evidently its idling position.

"Did you see that?" queried Gus.

Jim nodded.

"I think we're getting some place," Gus said hopefully. "Let's try her again."

After the two men had climbed back into the car, Jim pushed the starter and the motor caught without a falter.

"Now bring her up to forty again slowly," Gus instructed, "and the minute she runs away and then begins to sputter pull over to the side of the road."

Fast Footwork Aids Diagnosis

They didn't have to wait long before things started to happen again, and when they did Jim followed his instructions. Gus jumped out of the car, flipped open the hood, which he'd left unlatched, pulled off the air cleaner, and aimed his flashlight into the carburetor's throat.

"Take a look down there," Gus said after a quick inspection. "Even a carburetor's throat can develop tonsils."

Jim looked. There was at least a half inch of white ice blocking the throttle valve. As he watched, he could see the ice melting and suddenly there was that familiar metallic click he'd been hearing each time after his engine had died.

"There's your trouble," Gus said, tapping a metal tank mounted on the fire wall that held the water supply for Jim's water injector. "Your carburetor has been icing up because of the water you've been adding to your fuel."

"But Gus, the temperature hasn't dropped below freezing for weeks," Jim reminded him. "I know the manufacturer's instructions said not to use the injector when the weather dropped below thirty-two, and I haven't. As a matter of fact, when we left the house tonight it was a balmy forty-two."

"Outside, yes," Gus corrected, "but not inside your carburetor."

"Well, what a dope I've been," Jim groaned as he thumped his forehead with

[Continued on page 236]

Get Your Money's Worth From High Compression Engines and High Octane Fuels with

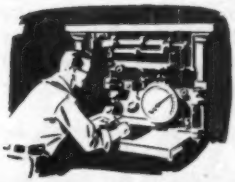
DEPENDABLE

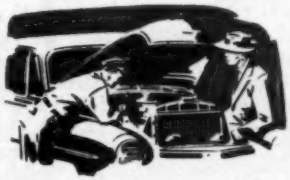
CHAMPION

Spark Plugs

BE A CHAMPION DRIVER

...Good spark plugs bring out the best in performance and economy!





Champion researchers and engineers work constantly with automotive and petroleum experts to give you better performance with today's engines and fuels.

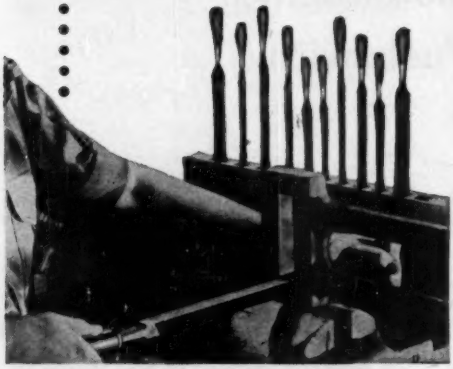
To get your full money's worth of power and mileage, insist on Champions and have them cleaned and checked regularly by Champion dealers to keep them efficient.

Champion has manufactured spark plugs exclusively for over 40 years. A better spark plug is the result—proved by Champion's leadership for over a quarter century!

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO

Listen to the CHAMPION ROLL CALL . . . Harry Wismer's fast sportscast every Friday night, over the ABC network

Variety is the spice of filing



A VARIED assortment of Nicholson or Black Diamond files is as much a part of the complete home workshop as a good assortment of bits, taps or chisels. For one thing, it means you always have exactly *The right file for the job.* For example: Mill (single cut) files for sharpening and smoothing. Flat files (double cut) for fast stock removal. X.F. Swiss Pattern files for precision work. Taper files for saw sharpening.

Equally important, Nicholson and Black Diamond quality means top performance. You can't buy files that are more accurately cut, more expertly hardened—more widely accepted by expert filers because of their fast, uniform cutting, and their extra-long life.

Your hardware dealer will be glad to help you work up an assortment of these famous files to fit your needs.

FREE—"FILE FILOSOPHY"
—a home-workshop manual on files. Its 48 illustrated pages cover the kinds, care and use of files. Send for your copy today. No obligation.

NICHOLSON U.S.A.

NICHOLSON FILE COMPANY
19 Acorn St., Providence 1, R. I.
(In Canada, Port Hope, Ont.)

BLACK DIAMOND TRADE MARK

NICHOLSON FILES *FOR EVERY PURPOSE*

Gus Tames a Runaway Engine

[Continued from page 234]

his fist. "A fine budding engineer. Of course, the venturi effect in the carburetor acts like the expansion valve in a refrigerator—it lowers the temperature."

"Right, and the temperature in the throat of a carburetor can be quite a bit below freezing even if the outside temperature is above freezing," Gus explained. "What's been happening is that first just enough ice has been forming at forty miles an hour to hold your carburetor throttle valve open at that position. Then as more and more ice has formed it has choked off the carburetor throat and starved the engine. Finally, when she did stall, it didn't take long for the heat of the engine to melt the ice and you were all set to go again."

"Live and learn," Jim grinned as he reached in under the hood and turned the petcock that shut off the water for the injector. "I guess about the only alibi I've got is that I'm an electrical engineer."

Causes Forced Landings, Too

"Well, at least you were a doughfoot and not a fly-boy in the last war," Gus said as they started back to town. "If you'd been a pilot, you'd have known that airplane carburetors often ice up under certain damp weather conditions in the summer when the outside temperatures are soaring in the nineties. That's why they put heaters in 'em."

"Well, since I don't have a heater in mine," Jim replied, "I guess I'll just have to forget about my water injector until warmer weather sets in again."

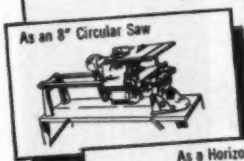
"Not necessarily," Gus corrected. "You can always add enough alcohol to the water in the tank to prevent freezing. As a matter of fact, the alcohol will add to the pep of your engine. Some injectors are designed to operate only on an alcohol-and-water mixture."

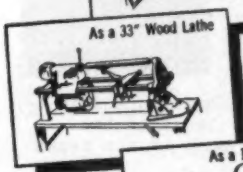
"Thanks a million, Gus," Jim said as he slowed the car to stop in front of Gus' house. "Now I can take off for home tomorrow night on schedule. Mom and Pop sure would have been disappointed if we hadn't been able to get together. Happy New Year, Gus."

"And a Happy New Year to you, Jim," Gus said shaking Jim's hand. "And while you're driving, look out for those holiday-happy goons who think they can mix alcohol and gasoline *without* an injector." END

IT'S SHOPSMITH FOR FLEXIBILITY

$189.50 complete except for motor, bench and casters.* Includes geared Jacobs chuck, 12" sanding disc, 8" saw blade, arbors, lathe centers, etc.





SHOP SMITH

EVEN a large shop fitted with a complete assortment of high-priced power tools won't give you the all-around flexibility you get with a SHOPSMITH.

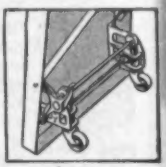
SHOPSMITH packs more tricks than a magician's kit! You can move it! Change it! Set it up to do 1001 work-saving jobs. You can saw full-size plywood panels without help. Drill room-length planks. Dowel perfect joints without jigs. Sand ends and joint edges to hairline dimensions. What's more, you can change SHOPSMITH from one standard tool to another *in less than sixty seconds.*

Add to its flexibility, SHOPSMITH's remarkable accuracy, its tremendous capacity, its rugged precision, and you'll understand why SHOPSMITH is the largest-selling power tool in America today.

See for yourself what SHOPSMITH can do — at leading hardware and department stores or any Montgomery Ward store. And for a booklet jam-packed with information on SHOPSMITH, send the coupon.

***NEW RETRACTABLE CASTERS**

Increase SHOPSMITH's already great flexibility. They're easily mounted on any wood or metal bench. Easy to set, too, with three-stage foot levers that raise or lower unit. Your SHOPSMITH dealer has them. Complete set.....$11.95



FREE—*Attractive 16-page SHOPSMITH booklet*

ADDRESS:

SHOPSMITH, Dept.151-A, *at factory nearest you:*
12819 Coit Road, Cleveland 8, Ohio, OR
417 Montgomery Street, San Francisco 4, Calif.

Please send me the free SHOPSMITH *booklet.*

*Name*_____

*Address*_____

*City*_____ *State*_____

Ideas out of this World

... yours with these Wizards with Wood

Ideas for bonding wood! Ideas for finishing effects! Want 'em? Then send postcard for leaflets on Firzite, Satinlac, Weldwood Glue — used by professionals and offered by United States Plywood Corporation. . . .

Glue That's Stronger than Wood

To make things or fix things, use Weldwood Glue for all wood-to-wood bonds. Makes joints stronger than the wood itself. Mixes easily with water. Stain-free, rot-proof . . . highly water-resistant! 15¢, 35¢, 65¢, 95¢ and larger sizes.

WELDWOOD
PLASTIC RESIN GLUE

A MUST for Finishing Fir Plywood

Tame that wild grain with FIRZITE. It tight-seals the pores . . . virtually prevents grain rise or checking . . . readies the surface satin-smooth for paint, stain or enamel. (For blond, pickled, wiped or tinted effects use White Firzite).

FIRZITE

Newer than Shellac or Varnish

Pints, Quarts, Gallons

For "natural wood" finishes on furniture or woodwork, there's nothing like Satinlac. Brings out the natural grain and color beauty of any plywood or solid wood. Avoids that "built-up" look, and will never turn yellow or darken with age. "Water-white", easy to brush or spray, dries ready for next coat in 2 or 3 hours.

SATINLAC

Ask for Weldwood Glue, Firzite and Satinlac at hardware, paint or lumber dealers.

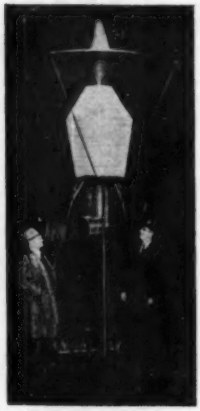
Send post card for interesting glue and finishing leaflets.

UNITED STATES PLYWOOD CORPORATION
Dept. 172, 55 West 44th St. • New York 18, N.Y.

Mechanics of Farming

By Ladd Haystead

■ Frost has been one of the greatest threats to agriculture since man first started to farm in the north temperate zone. To combat it, he has tried bonfires, smudge pots, frozen mist, helicopters. None has been more than partly successful. Evans Products Co., Plymouth, Mich., thinks it has the real answer: a radiant heater that works on the principle of bathroom electric radiant heaters. It sends out infrared rays that heat only an object they hit, such as a leaf or fruit. Air in between is unaffected. The Frostguard (right) is a tubular-steel tripod supporting a combustion chamber and a 7-foot aluminum reflector. Kerosene or No. 1 oil, pumped by an electric motor, burns at 1,750° F. Fuel consumption averages 10 gallons an hour. (Killing frost usually lasts only a few hours.) Many test units have paid their $350 cost in one season. The company predicts that their use may lengthen the growing season as much as six weeks.



■ A two-row cotton picker--self-propelled, rotating-spindle type--is announced by Allis-Chalmers for limited production at its Gadsden, Ala., plant.

■ A few years ago one poultryman taking care of 1,000 to 1,500 birds usually was overworked. Now going up on a Southern farm are two mechanized, 12,000-bird houses that one man will run.

■ "You'll never mechanize dairying," they used to say. But U.S. Dept. of Agriculture reports the job is well under way. Electricity provides fences, pumps water, lights and ven-

CHANNELLOCK *Belongs*

Made only by
CHAMPION DEARMENT !

Wherever PLIERS ARE USED!

When Mom or the kids get in a fixin' mood you can bet they'll do a better job when Channellock pliers are handy. Channellocks are easy to use, simple to adjust and—well, darn good pliers. They are made by Champion DeArment who for nearly 3/4 of a century have been making and selling highest quality tools. The next time you're shopping for tools ask to see Channellock pliers. Heft 'em, use 'em, test 'em—then buy 'em. On almost every job requiring tools, you'll find a use for Channellock. And remember, Only Champion DeArment makes Channellock. Send for Catalog D14 Today.

CHAMPION DEARMENT TOOL CO. • Meadville, Pa.

Channellock pliers are listed in the Yellow Pages of most Telephone Directories under "Tools"

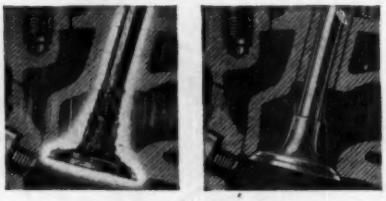
CHAN NEL LOCK

Why won't it start?

Oil congeals in cold weather, gets stiff, ties up your motor so it can't start.

Casite guarantees Quick Starting in Coldest Weather or Double-Your-Money-Back. Casite retards congealing of oil, lets your motor spin over and start, no matter how cold the weather.

Why *does* it jerk?



Chances are, your trouble is sticky valves.

Casite frees sticky valves and rings . . . gets rid of gum and goo . . . conditions your car for winter driving. Casite guarantees Better and Smoother Motor Performance or Double-Your-Money-Back.

New Car or Old Car . . . Get CASITE for Your Car

Your garage, service station or car-dealer will give you a Casite Treatment—75¢ a pint (95¢ in Canada). You'll get smoother, happier driving for many miles to come. The Casite Corporation, Hastings, Michigan. Casite Division, Hastings Ltd., Toronto.

QUICK STARTING IN COLDEST WEATHER
or Double-Your-Money-Back

tilates stables, powers mechanical barn cleaners, grinds feed, dries hay, fills silos, drives the milking machine, cools and pasturizes the milk--while farm-to-consumer processing and transportation are almost completely mechanized.

■ Cussing the moldboard plow has become the prime parlor game of many non-farmers in recent years, following attacks on that implement by adherents of the book, Plowman's Folly. Tests recently completed at the Geneva (N.Y.) Experiment Station, however, indicate that the moldboard gets better results on yields and soil condition--in the soil there, anyhow--than does disking, rotary tillage, or subsoiling. The tests offset, but do not entirely negate, claims for other types of soil treatment.

■ Newest use of the "wonder drugs" is in canning. Vegetables canned with antibiotics, says the U.S. Dept. of Agriculture, can be sterilized faster at lower temperatures, without pressure cooking. Better flavor is claimed because mild heat is used.

■ Apply science to the usage of farm products (chemurgy) and you have a subject as important to the farmer and the over-all economy as science-in-the-furrow. For instance, add hydrogen to corn sugar, as did Atlas Powder Co. in its new product sorbitol, and a whole huge new corn market is opened up. The substance absorbs water slowly--and holds it. It's useful in protecting against both drying out and sogginess of tobacco, printers' rollers, flexible glues, cork, cosmetics, candy, etc.

■ Tires made from waste of pulp-paper manufacture are reported by Drs. K. A. Kobe and R. T. Romans, of the University of Texas. The new chemical, replacing styrene, is called PADMS. First tests indicate the tires may be superior to present synthetic tires. Now the paper industry is waiting on the synthetic-tire industry to say how big orders will be before building new plants. And tire companies are waiting on pulp men to find out how much PADMS they can get before converting.

Repair Electrical Appliances and Utilities with the aid of

THE NEW MODEL 50

ELECTRICAL TROUBLE SHOOTER

Compact—Measures 3⅛" x 5⅞" x 2¼"

A NEW KIND OF INSTRUMENT FOR TESTING *ALL* ELECTRICAL CIRCUITS AND UTILITIES SUCH AS—

- Thermostats
- Lamps
- Tubes
- Fluorescents
- All Fuses
- Condensers
- Field Coils
- Fans
- Heaters
- Washers
- Soldering Irons
- Melting Pots
- Air-Conditioners
- Ballasts
- Lighting Systems
- Electric Ovens
- Solenoids
- Circuit Breakers

ALSO [ALL MOTORS—single phase, multi-phase, universal, squirrel cage, induction, in fact every type of motor from fractional H.P. to 2 H.P.]

THE MODEL 50 UTILITY TESTER:

- Will measure the *actual current consumption* of any appliance or utility either A.C. or D.C. and will measure it *while the unit is in operation.* The reading will be direct in amperes. The appliance or utility may be plugged directly into the front panel receptacle. A special pair of insulated clip-end leads is included for motors, etc.
- Will measure the actual voltage and indicate whether the current is A.C. or D.C. and if the frequency is 25 cycles or 60 cycles.
- Incorporates a sensitive direct-reading resistance range which will accurately measure all resistances commonly used in electrical appliances, motors, etc. This range will enable continuity checks and tests for shorts and opens.
- Will indicate excessive leakage between a motor and a line up to 10 Megohms.
- Will indicate when a three phase motor is running erratically due to a "blown" fuse.
- Will test Thermostats under *actual working conditions.*
- Is the ideal trouble-shooter as it will instantly locate opens, shorts and grounds.
- Will test all bulbs, radio tube filaments, pilot light lamps, all fuses including cartridge, screw, etc., fluorescent bulbs, etc.
- Will test condensers for both opens and shorts.
- Will accurately check and locate the exact cause of failure in 3 way heat control switches.
- Will check field coils for opens and shorts.
- Will indicate when one side of an appliance or motor connected to the line under test is "grounded".

SHIPPED ON APPROVAL
NO MONEY WITH ORDER—NO C.O.D.

TRY BEFORE YOU BUY! Yes, you need send no money with order or pay anything on delivery. Simply fill out this order form and mail it today. Try the Model 50 for 10 days. If completely satisfied, remit $13.90. If not, return the instrument—no explanation necessary.

The Model 50 Utility Tester comes housed in a round cornered molded bakelite case. Complete with all test leads and operating instructions—only . . . . .

$13.90

SUPERIOR ELECTRONIC CO., INC. PS-1
227 FULTON STREET, NEW YORK 7, N. Y.

Please rush one Model 50 Utility Tester. I will either remit $13.90 after a 10-day trial or return the instrument via Parcel Post.

Name.....

Address.....

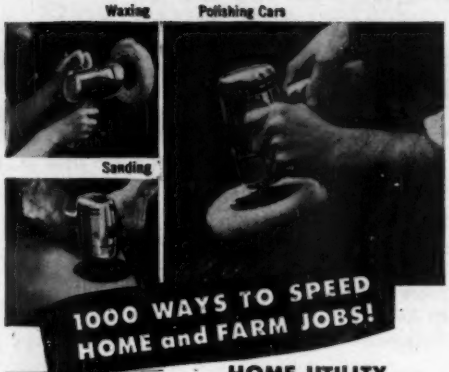
City.....State.....

FREE PREMIUM!!

☐ Check here if you include $13.90 payment with order. In return for saving due to bookkeeping, we will include a set of 6 assorted key chains with your Model 50. If the Model 50 does not meet with your wholehearted approval after a 10-day trial, return it for full immediate refund of $13.90—keep the premium for your trouble.

Waxing

Polishing Cars



Sanding

1000 WAYS TO SPEED HOME and FARM JOBS!

Drilling

Wood Boring

Wire Brushing

HOME-UTILITY
5" ELECTRIC
SANDER-POLISHER
only $32.95 (complete)

There's almost no end to the jobs you can do with a Home-Utility Sander - Polisher! It comes *complete* with sanding discs, lambswool bonnet, ¼" drill chuck, cans of polish and wax. It drives many other inexpensive attachments for grinding, sharpening, buffing, burnishing, cleaning. It has an extra-powerful motor for high-speed work from AC or DC outlet. It weighs only 3½ lbs., easy for the whole family to use. And it's quality-built by BLACK & DECKER, world's largest portable electric tool maker. Try it at your hardware, electrical appliance or implement dealer's or department store.

Products of HOME-UTILITY Div., The BLACK & DECKER Mfg. Co., Dept. H1S, Towson 4, Md.

ELECTRIC HOME-UTILITY TOOLS

¼" DRILLS and ½" DRILLS • TOOL KITS
LECTRO-SAWS • BENCH GRINDERS

ARC WELDING
FOR PROFIT OR PLEASURE

60 LBS. OF READY MADE PARTS Only $24.95

BUILD YOUR OWN HEAVY DUTY WELDER

SAVE BUY ONLY NECESSARY PARTS

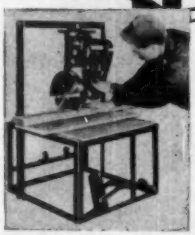
All necessary parts Ready-Made and easy to assemble. You can do all around welding on steel, cast iron and other metals after only a few hours practice. Illustrated instruction manual included. Sold on 30 Day Money-Back Guarantee! Free plans for building case.

FREE: Write today for fully illustrated Pamphlet S-1

Gives 100% penetration. Welds are stronger than original metal. Operates on 110 or 220 AC.

ATOMIC ARC WELDER CO.
1039 So. 19th St., OMAHA, NEBR.

Saw Sharpens Its Own Blades



By changing the basic power unit to different locations on the table, the Saw Shop-ette can be used as a swing saw, rip saw, sander, tool grinder, miter saw, metal-cutting saw, and also a tool to sharpen and gum its own blades. Dadoing can also be done on the unit. It is made by the P. T. Hobbs Machinery Co., of Portland, Ore.

The machine is priced at $128 and includes a ¼-hp. motor with cord, a cut-off saw, a rip-saw blade, and a grinding wheel. A ½-hp. motor is available for an extra $12.50.

The commercial-type circular-saw gummer and sharpener takes care of all types of blades from 4" to 20" in diameter.

Brush Handle Serves as Scraper

The molded-plastic handle of this paint brush is chisel-shaped for removing blisters and loose paint, thus serving as a scraping tool. Chinese hog bristles form the brushing surface. Available from Sears, Roebuck, it is made in seven widths from 1 to 4 in.

BE YOUR OWN BOSS!

MAKE BIG MONEY

Why stay in a rut working for someone else? Now—give your ambition a chance to MAKE BIG MONEY—with steady year 'round work—indoors—in a good respectable business of your own! Be a floor surfacing contractor with American Machines!

No schooling—no experience needed. Sanders are easy to operate—and you can start making money the first day your machines arrive! Earnings of $25 and more a day are not uncommon. Hundreds of prospects—new and old homes. Investment in equipment is small—no large overhead. Many men operate from their own homes. An opportunity to get ahead and MAKE MONEY! Send coupon for "money-making" booklet entitled "Opportunities in Floor Surfacing"—enclose 25c in coin or stamps to cover handling.

THOUSANDS are SUCCESSFUL!

- H. M. Thompson and son have been sanding floors for 16 years; busy all the time.
- Ray Lease, Madison, bought his first American sander in 1938. Now has a ten man crew and office.
- Ed Bailey, Florida floor surfacing man, finds time to enjoy his own fine speedboat.

The American Floor Surfacing Machine Co.
532 So. St. Clair St., Toledo, Ohio

Enclosed find 25c in stamps or coin for booklet "Opportunities in Floor Surfacing", telling me how I can start my own floor sanding business.

Name_____

Street_____

City_____ State_____

AMERICAN FLOOR MACHINES

SEND

Easy and Cheap to Operate

SAVE TIME, WORK, MONEY!

SHAW "DU-ALL" and "PEPPY PAL" TRACTORS

PLOW

CULTIVATE

These rugged walking or riding tractors are ideal for farm, truck garden, orchard, poultry farm. Operate on a few cents an hour. A child can handle them.

DO DOZENS OF JOBS Both riding and walking tractors quickly and easily plow, cultivate, harrow, disk, bullclose, spray, haul, grind, saw wood, etc.

LOW FACTORY PRICES Buy direct or through your dealer. Year's guarantee!

RIDING TRACTORS 4 models from 5 to 12½ H.P., 58 in. wheelbase, 36 to 52 in. wide, 24 in. plant clearance. Hand or electric starter. Walking Tractors 1½ to 5 H. P.

FREE Illustrated folders giving complete details and price lists—write today!

SHAW MFG. CO. 5701 FRONT ST., GALESBURG, KANS. 668 PS NORTH 4TH ST., COLUMBUS, O.

TOUGHEST PAINT STRIPS OFF

For a quick, easy job, try WONDER-PASTE! Applied with a paint brush, it quickly reduces the toughest finish to a soft, pulp-like mass that EASILY PEELS OFF with a putty knife! Leaves a smooth, clean surface, requiring no sanding. Safe for wood, metal, fabrics and hands. Long a favorite of professional painters. At leading paint and hardware dealers.

Write for leaflet on

WONDER-PASTE

Wilson-Imperial Company, 121 Chestnut Street, Newark 5, N. J.

CUT-TO-FIT HOMES CUT BUILDING COSTS

ORDER NOW SAVE UP TO 1/3

Build your own home and save the builders' profit—plus savings in lumber and labor with Sterling Ready-Cut-Homes. Anyone can assemble with simple, easy to follow plans furnished. Every house complete with all lumber, roofing, nails, glass, hardware, paint, doors and windows marked ready to erect. Freight paid. Complete building plans ready for filing at low cost. Sold separately if desired. Write today!

CHOICE OF 57 DESIGNS

PRICED FROM $2132 UP

Five Easy Payment Plans

Send 25c for NEW COLOR CATALOG

INTERNATIONAL MILL AND TIMBER CO.
DEPT. PS-151, BAY CITY, MICHIGAN

WANT to chop $25—$50 off your heating bills this winter, and enjoy greater comfort at the same time? Then insulate your attic or top floor ceiling with new fireproof Gold Bond Rock Wool Insulation. A cinch to install. Comes in 2′ or 4′ Enclosed Batts and new 8′ Sealed Blankets, in standard widths that fit snugly between attic floor joists or roof rafters. Completely enclosed for easy handling with Vapor Barrier on face side. Keeps furnace heat in and summer heat out. Get Gold Bond Enclosed Batts or Sealed Blankets from your dealer today. And for best results be sure to order them "full-thick"! Free descriptive booklet sent on request. Write Div. Y, Dept. PS-1.

Available at your local Gold Bond lumber and building materials dealer

NATIONAL GYPSUM COMPANY
BUFFALO 2, NEW YORK

MAKE *Big* MONEY
SHARPENING LAWN MOWERS
WITH THE
Universal
LAWN MOWER GRINDER

Enjoy a profitable lawn mower sharpening business of your own. No previous experience needed. Place a hand or power mower on the Universal Grinder. With only **one set-up** you quickly grind the stationary blade and all of the reel blades to proper clearance *without removing a single blade from mower.*

G. Spurlock of Arkansas writes: "I have had my Universal Grinder only 2 months. Live 1½ miles from town. Yet have already made net profit of $227.00."

J. L. Peterman of Pa. writes: "Thank you for getting me started in this wonderful business . . . I averaged $100.00 a week in May, and made $1000.00 spare time this season."

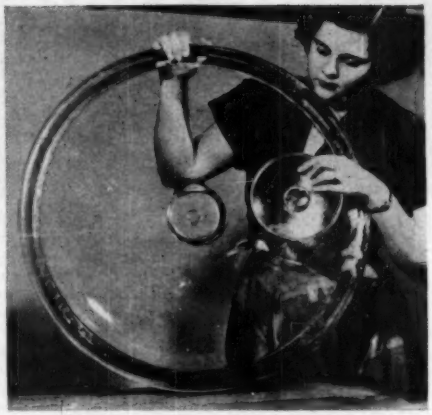
TRULY A BIG MONEY MAKING BUSINESS

ROGERS MFG. CO., Dept. PS-11, Lindsey, Ohio

SEND THIS COUPON *NOW*

ROGERS MFG. CO., Dept. PS-11, Lindsey, Ohio
Please send me full facts about the Universal Lawn Mower Grinder and its big money making opportunities.

NAME_____
ADDRESS_____
CITY_____ STATE_____



Big TV Mirrors Are Mass Produced

ONE obstacle to the development of large-scale projection television has been the difficulty in making big magnifying mirrors. Now mass-production methods have been adapted to turning out 26-inch mirror blanks, like the one shown above alongside a six-inch size used for home projection. Made by the McKee Glass Co., Jeannette, Pa., for RCA, it is two inches thick, weighs 90 pounds. When polished and aluminized, the big mirrors will produce 15- by 20-foot TV images—the size of a theater screen.

Hand Lamp Beams Spot or Spread

THIS electric lamp, powered by a 6-volt battery, can be focused to throw a bright spot or spread a wide beam. Weighing 48 ounces and measuring 6¾ by 8½ inches, it can be carried in an overcoat pocket or kept in most glove compartments. Made by the U-C Lite Mfg. Co., Chicago, Big Beam Jr., sells for $6.75, without battery.

CAMPBELL-HAUSFELD Spray Painting Outfits

Outperform them all!

DO more and better painting in an hour than you can brush on in a day. Same compressor inflates tires, lubricates cars, tractors, implements.

4 models, precision built for trouble free service. Last a lifetime. Gasoline or electric power.

See them at your dealer or write for literature, giving his name.

pressure maid

New Low Priced Pressure Maid . . . dwarf in size . . . giant in power.

THE CAMPBELL-HAUSFELD CO.

151 RAILROAD AVE. HARRISON, OHIO

4000 fine tools, available direct from factory to user. Send 10c for complete 104 page catalog.

SNAP-ON TOOLS CORP.
8060-A 28th Ave., Kenosha, Wis.

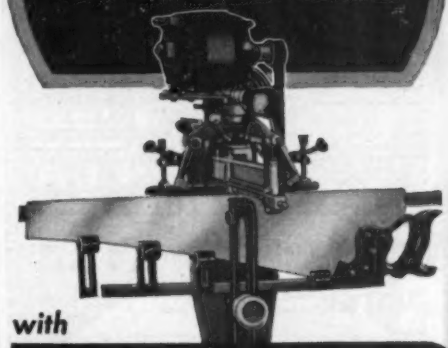
Original-Genuine
VISE-GRIP WRENCH

VISE-GRIP's the most useful tool you can own! VISE-GRIP LOCKS to work with more than Ton-Grip . . . holds anything! Works wonders in hard-to-get-at places. Easily turns battered nuts, bolts, worn screws—holds the smallest parts for gluing, filing, sawing, etc. With cutter—No. 7W, 7", $2.25; No. 10W, 10", $2.60. Without cutter—No. 7C, 7", $1.95; No. 10C, 10", $2.25. No. 7, 7", $1.85; No. 10, 10", $2.15.

Order from your dealer

PETERSEN MFG. CO., Dept. M-1, Dewitt, Nebr.

Made $900 IN SPARE TIME



with

FOLEY* automatic SAW FILER

*Trade Mark Reg. U. S. Pat. Off.

"I did very well last year with my Foley equipment, about 950 saws and 240 lawn mowers, in my spare time. About $900 for me."—Leo H. Mix. "I have done 4 or 5 thousand saws in my spare time in the 4½ years since I got the outfit, and they are all coming back."—says Len Crego.

Make up to $2 or $3 an hour in Spare Time. With the high prices of food, clothing and everything else, just think what you could do with extra money every week! With a Foley Automatic Saw Filer you can file hand, band and circular saws better than the most expert hand filer. "The first saw I sharpened with my Foley Filer came out 100%"—writes Clarence E. Parsons. Every saw you sharpen with the machine accuracy of the Foley Saw Filer is an ad that brings you more customers. Cash business, no canvassing. No eyestrain, no experience needed.

FREE BOOK "INDEPENDENCE AFTER 40!"

Shows just how you can start at home in spare time in your basement or garage. Just think—with a small investment, no overhead, no stock of goods to carry, you can get right into a cash business—and later on develop into a full-time repair shop. Send coupon today for this practical plan. No salesman will call.

Send Coupon for FREE BOOK

FOLEY MFG. CO., 119-1 Foley Bldg., Minneapolis 18, Minn.
Send FREE BOOK—"Independence After 40".

Name.....

Address.....

Save time! Save money!
SEND FOR THIS BIG NEW

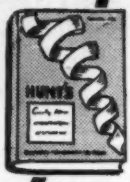
HUNT'S WOODWORKERS CATALOG NO. 17

NEW LOW PRICES

Greatest selection of fine domestic and imported woods--144 pages of real money-saving bargains

QUICK DELIVERY on maple, poplar, oak, mahogany, red cedar, cherry, walnut, and many others—all properly seasoned and kiln dried.

EVERY wood craftsman should have this big new catalog. Shows 32 rare and fancy woods in color... 43 veneer designs... multicolored bandings, inlays, overlays...275 scroll patterns...all kinds of tools, machinery, cabinet hardware, ornaments, mouldings...plus... pages of ideas, hints, instructions, and information for beginner and advanced craftsman. You'll save time and money with this catalog. Yours for only 15 cents — refundable on first order. Use the coupon—send for your copy NOW.



ONLY 15c

MAIL TODAY

CRAFTSMAN WOOD SERVICE CO.
2729 South Mary Street, Dept. B-1,
Chicago 8, Illinois

Please send me your big, new Catalog No. 17. Enclosed is 15c--to be refunded on my first order.

NAME.....
ADDRESS.....
CITY.....ZONE.....STATE.....

The New

CUSHMAN EAGLE

Only 3/4¢ per mile total operating cost

The new CUSHMAN "Eagle" fairly screams its plus values. All the well-known CUSHMAN economies: Low purchase price, low upkeep, low operating cost—PLUS new styling, new riding qualities and POWER. Get new illustrated folder now FREE. Rider-Agent Plan available. WRITE DEPT. 2S

Dealer Inquiries Invited

Cushman MOTOR WORKS, INC.
LINCOLN, NEBRASKA

a complete shop in one precision machine!

The IDEAL LAWNMOWER SHARPENER

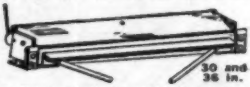
- sharpens hand and power mowers
- completely new—based on 48 years of lawnmower sharpener experience
- complete with bed knife grinder and lapping-in Reconditioner—all operated by same motor

You can do *precision* lawnmower sharpening faster and easier than ever before on the Model 300 Ideal Sharpener. No disassembling needed, place the entire mower in the machine. You can make more money and do better work with an Ideal. Get all the facts, compare, no other sharpener offers as much as the Model 300 Ideal.

Write Today For Free Catalog

THE FATE-ROOT-HEATH COMPANY
DEPT. H-4, PLYMOUTH, OHIO

SHEET METAL BRAKES



Forms angles, flanges and Pittsburgh locks. 26 gauge steel, heavier aluminum. Cam locking. Portable, can be bolted to bench, or clamped to edge of truck. All steel, reinforced. Shipped Exp. Coll. 30" size. Wt. 52 lbs., **$26.50.** 36". Wt. 62 lbs. **$31.00.** 48", **$45.00.** Floor mountings, portable, 30" high, **$7.00.** 12" BRAKE. Fits in vise to form difficult compound bends, up to 20 gauge steel. Not illustrated.....**$12.50 PP.**
24" CURVE FORMER, Capacity--16 gauge steel.....**$10.00**
IRON BENDER, 1/4x2" capacity. 9 parts. All steel.....**$10.00 PP.**
Immediate delivery. Order direct, cash or C.O.D. or send for folder.

VYKE BRAKE CO., 3-1116 So. 27th St., Omaha 5, Nebr.

EVERY ELECTRIC DRILL A PORTABLE SAW

At Better Hardware Stores Everywhere

9.95 with 4" "HYCARBON" Crosscut Blade

Can Be Used With One Hand!
Any 1/4" or 3/8" Drill a Powerful Saw in ONE MINUTE

"ARCO-SAW" is a rugged tool with right angle gear drive (no clumsy, dangerous, direct drive with drill sideways). Works like a high priced Portable Saw.

CUTS 1-5/16", or 2x4 by turning over

ONLY *ARCO* GIVES YOU ALL THESE FEATURES: **Safety-yoke** assures rigid connection and **absolute safety—Big handle** affords firm grip for two-hand operation—**Precision one-piece gear box—Self-lubricating** lifetime bearings—**Visual guide and wide shoe-plate** for straight, square cuts—**Lowest priced, quality Replacement Blades.**

"HYCARBON" 4" Crosscut or 4" Combination Blade.....$1.60 ea.

90-day Factory Guarantee

ORDER TODAY at your dealer or send us check or M.O. (Postpaid). C.O.D.'s—Postage extra

Pat. Pend.

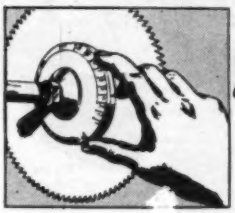
ARCO SAW

UNCONDITIONAL 10-DAY MONEY BACK GUARANTEE

DEALERS—Write for nearest jobber.

ARROW METAL PRODUCTS CO.
DEPT. PS-1. 140 WEST BROADWAY, NEW YORK 13, N. Y.

Better, Easier, Quicker
GROOVE CUTTING or CABINET-MAKING
with Warren DADO SAWING WASHERS



Just dial · DESIRED CUT

Cut accurate, parallel grooves—any width, any angle. Just dial desired width with Micromatic adjustment. Cuts smooth and clean—no burning or chewing to mar fine wood. Just four simple washers. Available in 5 sizes—½", ¾", ⅝", 1", 1⅛". Free booklet on request. See your dealer or write direct. Absolutely guaranteed! In Canada, send money order for $4.95 (duty and sales tax extra).

$4.95 A SET

Dealers, Jobbers, Write for Information!

WARREN DADO SAWING WASHERS CO.
70 Medbury, Dept. 41, Detroit 2, Michigan

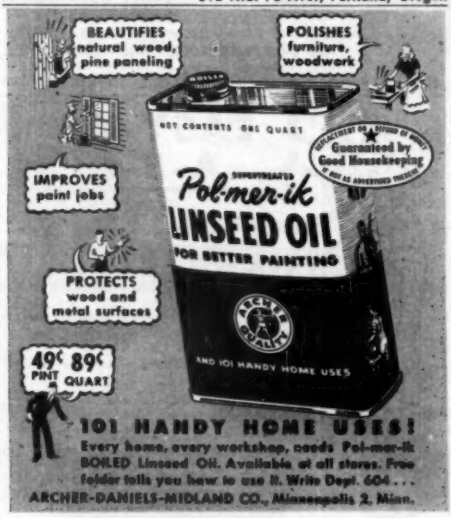
FILE your own SAWS . . . easy!

Do expert saw filing without experience. Keep your hand saws extra sharp, true-cutting. Easy to use. Money back guarantee. Cash with order, prepaid. (COD postage extra.)

COMPLETE WITH FILE $2.95

A SPEEDCOR TOOL!

THE SPEED CORP. PS-1
512 N.E. 73 Ave., Portland, Oregon



101 HANDY HOME USES!
Every home, every workshop, needs Pol-mer-ik BOILED Linseed Oil. Available at all stores. Free folder tells you how to use it. Write Dept. 604 . . .
ARCHER-DANIELS-MIDLAND CO., Minneapolis 2, Minn.

FREE get it Now-
ALLIED'S 1951 TV and RADIO CATALOG!
212 Pages of BIG VALUES

EVERYTHING IN RADIO AND TV AT LOWEST PRICES

EVERYTHING FOR EXPERIMENTERS, BUILDERS, AMATEURS, SERVICEMEN, ENGINEERS, SOUNDMEN

Save money on every Radio and TV need! Get the big 212-page 1951 ALLIED Catalog featuring the world's largest stocks of top-quality equipment at low, money-saving prices! See the latest TV releases, home radios, radio-phonos, Amateur equipment, P.A. systems and Hi-Fidelity Custom Sound, recorders, test instruments, builders' kits—plus thousands of parts, tools, books and diagrams. Get more for your money from the World's Largest Radio Supply House. Send today for your FREE new 212-page 1951 ALLIED Catalog!

ALLIED RADIO
833 W. Jackson Blvd., Dept. 7-AA-1
Chicago 7, Illinois

FREE CATALOG

☐ Rush FREE 212-Page ALLIED Catalog.

Name.....
Address.....
City.....Zone....State.....

brand **NEW** *just off the press*

CONSTANTINE'S MANUAL FOR WOODWORKERS HOBBYISTS HOME OWNERS 116 PAGE BOOK

a complete catalog!

AND REFERENCE BOOK OF WOODS, VENEERS, LEATHER, METAL, PLASTICS, ETC.

This is the biggest, most complete manual we ever published. More new items, on leathercraft, decorative metals, wood finishing, hard to get items of all kinds . . . in addition to our power and hand tool sections, upholstery, picture frame mouldings, rare and domestic woods, veneers, lumber, inlay panels, 83 inlay designs, inlay borders, all in full natural color, plus a full color wood identification panel of 60 different woods suitable for framing. All items at lowest prices from America's Biggest Supplier to Craftsmen.

Send today for your copy of the hobbiest's most helpful book.

SEND FOR YOUR COPY TODAY

FREE With each copy of our Master Manual, you get a year's subscription to Chips and Chats, a breezy bimonthly to keep you up-to-date on what craftsmen are doing.

ALBERT CONSTANTINE & SON, INC., DEPT. PS-1
797 East 135th St., New York 54, N. Y.

Enclosed find 25¢ for a copy of your "Master Manual" and a FREE one year's subscription to Chips and Chats.

NAME_____

ADDRESS_____

CITY_____ STATE_____

"YANKEE" VISES

hold work through every step without a misstep

Any job locked in a "Yankee" Vise, is correctly positioned for every operation . . . hand or machine. Lifts on and off swivel base at bench. Machined accurately . . . top, bottom, sides and front end . . . V-grooved block for rounds. Four sizes, with and without swivel base . . . 1½", 2", 2¾" and 4" jaw widths. At your dealer's.

Write for "Yankee" Tool Book

NORTH BROS. MFG. CO.
219 W. Lehigh Ave., Phil. 33, Pa.

YANKEE TOOLS NOW A PART OF STANLEY
THE TOOL BOX OF THE WORLD

KING MIDGET *Home Assembled Auto*

WORLD'S LOWEST PRICED CAR!

Drive this car for as low as 30c per week. Precision built parts direct from factory with beautiful all steel body. Get the facts on this amazing small auto—send 25c for detailed circular with large picture. 3 view drawings and price of all parts, or send $1 (refunded first order) for this plus actual assembly book with 42 photos, drawings: blueprints of snow, ice conversions. Ideal for micro-midget racing—Get this information.

MIDGET MOTORS MFG. CO.
ATHENS 2, OHIO

DU-FAST OSCILLATING MOTION SANDER

. . . BEST VALUE BAR NONE!

Where in the world can you get FULL ½" OSCILLATING MOTION . . . LARGE 3-2/3" x 7" FAST-WORKING SURFACE THAT USES INEXPENSIVE STANDARD CUT PAPERS . . . LIGHT WEIGHT FOR EASY CONTINUOUS USE?

Where in the world can you get the economy and convenience of a powerful sander and polisher that attaches in 10 seconds to any Home Utility Black & Decker ¼" Electric Drill? Or (another Du-Fast model) that attaches just as easily to any Skil Home Shop ¼" Electric Drill?

Where can you get the safety that permits you to sand or polish with absolutely no chance of gouging, marring, swirling or burning? YET GIVES A PERFECT FINISH EVERY TIME?

See your nearest hardware dealer carrying either Skil or Black & Decker tools. *ASK TO SEE AND TRY A* DU-FAST *UNIT* . . . YOU'VE GOT A PLEASANT SURPRISE COMING!

DU-FAST OSCILLATING SANDER powered by Home Utility B & D ¼" Electric Drill.

ONLY **$14.95** FOR ATTACHMENT!

DU-FAST OSCILLATING SANDER powered by Skil Home Shop ¼" Electric Drill.

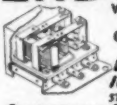
ONLY **$14.95** FOR ATTACHMENT!

*Pat. Applied For

MANUFACTURED BY **DU-FAST, INC.**
32 East Fourth Street New York 3, N. Y.

END TROUBLE

GENERATOR REGULATOR BATTERY
REPLACE VOLTAGE REGULATOR
WITH AMAZING NEW WATTAGE REGULATOR
GREATEST ADVANCEMENT IN AUTO IGNITION
SINCE THE SELF-STARTER
DRIVE WITH OR WITHOUT BATTERY
100,000 MILE MONEY BACK GUARANTEE
STATE MAKE AND MODEL OF CAR AND SEND FOR FREE CATALOG



SCIENTIFIC ELECTRIC CO P.O. BOX 216212 STA. H Cleveland 8 OHIO.

EASY AS A-B-C...

. . . to make furniture for your home, or for gifts, with Rogers how-to-do-it woodworking plans. They're easy to follow!

You also get a full size bottle of Rogers famous Gorilla Grip glue—all for only 10c! Your furniture will last a lifetime with Rogers. It has a ton of strength in every drop. Ask for Rogers at your local Hardware Store.

Don's miss this great offer! Send 10c today to Rogers Isinglass and Glue Company, Gloucester, Mass.

The Glue With the Grip of a Gorilla!
ROGERS
The best LIQUID FISH GLUE
GLOUCESTER MASS

ANNOUNCING!!!

ALL PRICES LESS MOTOR
F.O.B. KALAMAZOO, MICH.

★ Look at the tools . . . *look at the prices!* If you're one of those men who have long wanted a home shop equipped with fine precision tools, but haven't wanted to spend the money for large, expensive machines — these Atlas Workshop Tools will suit you to perfection. Each one is backed by 40 years of Atlas precision-engineering. They give your shop *greater* versatility at *less cost* than any tools or combination tool you can buy! — *and all 5 can be powered with 1 motor!* You'll want to see them at your first opportunity. Ask any Atlas or Atlas-Power King dealer for full details. Send the coupon for complete catalog.

SEND FOR FREE CATALOG

ATLAS PRESS CO.
155-W N. Pitcher St., Kalamazoo, Mich.
Please rush your Workshop Tool catalog.

Name_____

Address_____

City, State_____

40TH YEAR Atlas

ATLAS PRESS COMPANY
155-W N. PITCHER ST.
KALAMAZOO, MICH.

DEPENDABLE QUALITY TOOLS

NO CAR SHOULD BE WITHOUT ONE!

CASCO VIS-O-LITE

Illuminated Automatic

CIGARETTE LIGHTER

Why be without the convenience of this great new Vis-O-Lite illuminated lighter that makes driving safer day and night? You can replace your old lighter with a new Vis-O-Lite in a matter of minutes with pliers and screwdriver . . . and get the advantages of an illuminated lighter—well that ends fumbling in the dark, prevents scratching dashboards. Made by the manufacturers of the original pop-out lighter that's standard equipment on 4 out of 5 cars. Costs only **$2.75** complete. The illuminated well-assembly alone (minus the pop-out unit) costs only **$1.25.** Now on sale at Car Dealers, Auto Supply Stores and Service Stations.

NO HOBBYIST SHOULD BE WITHOUT ONE!

LOWEST PRICE EVER... *for a* CASCO

only $9.95

NEW CASCO-CRAFT 14 Pc. Kit

A complete, practical power-workshop for craftsmen, hobbyists! Has accessories to drill, cut, etch, carve, grind, buff, sand, engrave and sharpen—metal, wood, glass, leather, plastic and fibre. 1001 year-round money-saving uses. AC and DC. At Dept., Hardware, Appliance, Jewelry Stores.

WRITE FOR NAME OF NEAREST DEALER

CASCO PRODUCTS CORPORATION
BRIDGEPORT 2, CONNECTICUT **CASCO**

5 BIG POWER TOOLS in ONE

RETAIL PRICE $125.00

FACTORY TO YOU $59.95

SUPERSHOP the PRECISION BUILT WORKSHOP. Lifetime lubricated **BALL BEARINGS.** All running parts precision **GROUND.** Compare finest production tools. **BIG** capacity. Amazing **VALUE.** Write for **FREE** catalog, full details, trial plan.

POWER TOOLS, INC. 219 Yates Avenue Beloit, Wisconsin

LATHE GRINDING ATTACHMENT

The New "HURON CHIEF"—A *Wet Grinder* For 8" to 18" metal lathes! BUILD IT YOURSELF from our semi-machined castings and save $$. Grinds with coolant on wheel and work. Controls dust and heat. Will grind with the finish and precision of a specialized grinding machine. Does both external and internal work, valve and piston grinding, cutter and tool sharpening, production grinding, etc. WRITE for FREE illustrated folder and price list of castings, parts, grinding wheels, coolant, etc. Mention your lathe.

HURON MACHINE AND TOOL CO., Dept. C, Yale, Michigan

ONE-MAN SAWMILL LOW AS $50.00 DOWN

Take BELSAW Portable Sawmill right to the trees—turn out valuable lumber for local yards—do "custom sawing" for neighbors. BELSAW lasts a lifetime. No crew needed. Power with old auto engine. Beginners get excellent results. Send postcard for FREE BOOK. "How To Make Lumber."

FREE BOOK

BELSAW MACHINERY CO
8461 Field Bldg. Kansas City 2, Mo.

SILVER SOLDER TORCH & KIT $6

Joins All Metals Permanently

EQUAL TO WELDING FOR MOST PURPOSES

Do your own repairing. Kit includes one tube silver solder flux and 10 5-in. lengths silver solder alloy. Hottest ALCOHOL TORCH known. 2700° F. flame. Operates in any position, indoors or out. Torch alone $5. Kit alone $1.50. Complete instructions included with torch and kit. *Add 20c each order to apply towards shipping charges*

AMERICAN PRODUCTS CORP., 422 S. Dearborn St., Dept. 2A, Chicago 5, Ill.

NONE BETTER!

SUPER DRILL GRINDER

Sharpens round shank drills from 3/32" to 1/2" in diameter, up to 6" long. Grinds old drills like new in 4 different point angles, using hand or power grinding wheels. Money-back guarantee.

Price only $2.95
At Dealers or Postpaid

Crandall Mfg. Co. 1812 W. Slauson, Dept. FB-53, Los Angeles 44, Calif.

CASTINGS BLUE PRINTS BUILD YOUR OWN MACHINE TOOLS!

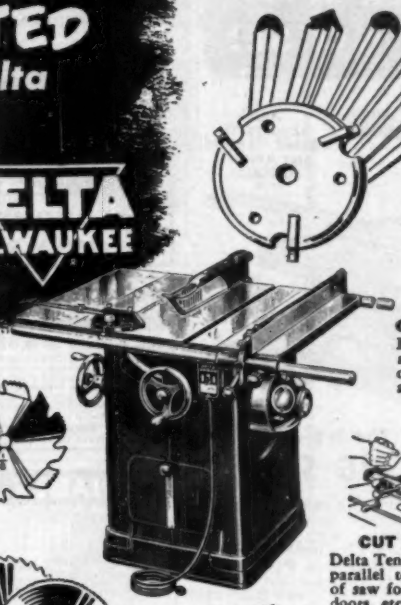
Catalogue with complete construction drawings of this bench milling machine or six inch shaper 25 cents per set postpaid or send one dollar for drawings of shaper, four millers and bench lathe. Refund on castings order.

DAVID JONES MACHINE CO.
1826 STRATFORD AVE. BRIDGEPORT, CONN.

DELTA SAW USES ARE UNLIMITED

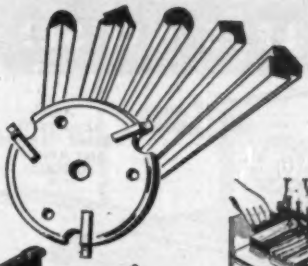
and only Delta offers you all these features!

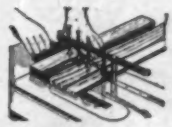
DELTA
MILWAUKEE



MAKE THOUSANDS OF SHAPES

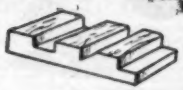
Here's a real value! One low-cost Delta Moulding Cutterhead Set like this No. 34-813 makes your saw a shaper! And Delta's 27 different Moulding Knife Sets give you thousands of shapes!





CUT ODD SHAPES SAFELY

Exclusive Delta clamp attachment No. 865 on miter gage holds odd-shaped pieces firmly, safely and accurately!

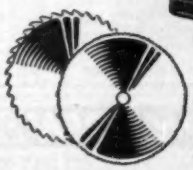


DADO CUTS UNLIMITED

Delta's No 333 Dado Set will straight dado, gain, plough, rabbet, groove, splice cut and do all jobs with and across the wood grain!

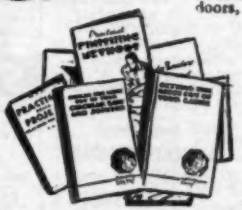
CUT TENONS ACCURATELY

Delta Tenoner No. 1172 safely cuts square, parallel tenons in sizes to full capacity of saw for furniture, storm sash, screens, doors, etc.



MAKE ALL BASIC SAW CUTS

Cross-cut, miter, rip, bevel, cut-off, double miter, angle rip and any variation made easier Delta furnishes the right blade for every job!



"HOW-TO" HELPS

CUT METALS AND OTHER MATERIALS

Cut thin-wall tubing, solid bars or sheets—cut tile, brick, bakelite, plastics, porcelain and other materials with proper blade or abrasive wheel!

Only DELTA makes a full accessory line — provides ideas and easy-to-follow instructions on how to get the most out of DELTA power tools. Take advantage of the exclusive DELTA "over-all" service — keep your power tools busy — take on new jobs — have fun and make new profits with DELTA power tools and accessories.

Look for the name of your Delta dealer under "Tools" in the classified section of your telephone directory.

Free!

Catalogs and bulletins on complete Delta line.

DELTA POWER TOOL DIVISION

Rockwell
Manufacturing Company
MILWAUKEE 1, WISCONSIN

TEAR OUT COUPON AND MAIL TODAY!

DELTA POWER TOOL DIVISION
Rockwell Manufacturing Company
804A E. Vienna Ave., Milwaukee 1, Wis.

Send me free catalogs and bulletins on the complete Delta line of tools and accessories.

Name.....

Title.....

Company.....

Address.....

City.....(.....) State.....

8-15

NEW SAFE SAW

CUTS ONE INCH WOOD 50% FASTER WITH 70% LESS NOISE!

Arm in normal position

SYNCRO ELECTRIC

The New 201 JIG SAW

Here's the largest, most powerful jig saw of its kind . . . yet SAFE for children! A "must" for Dad's workshop. Now 70% quieter operation with 50% more power. Cuts any length 1" wood, thin metal, plastic. Precision built to last a lifetime. Portable. Perfect for even apartments! 14,400 Safety Strokes a minute! ENTIRE Saw listed by UL—not just the cord! Built-in Power Unit guaranteed against burn-out all during your ownership or replaced Free! *COMPLETE with BUILT-IN Fractional Horsepower Reactor Type Electric MOTOR, Blades, Cord—only $22.95.*

New Improved

SYNCRO SANDER POLISHER and MASSAGER

Comparison proves it best! Exclusive Double Arc Motion. For all light sanding, high polish jobs in tight places, corners, etc. Marvelous massager. 240 strokes a second—just guide it. UL-Listed.

COMPLETE with BUILT-IN Fractional Horsepower Reactor Type Electric MOTOR, 10 sandpapers, lamb's wool and fabric pads, $16.95

SYNCRO POWER UNITS GUARANTEED AGAINST BURN-OUT ALL DURING YOUR OWNERSHIP or Replaced FREE!

THAT'S The Name To Ask For!

SYNCRO QUALITY TOOLS

Operate on 60 cycle, 110-120 volt, AC only. Buy at hardware, department stores. If none near, send article price, we'll ship POSTPAID.

SYNCRO CORPORATION
Dept. G-11, Oxford, Michigan, U.S.A.

STOPS LEAKS *PERMANENTLY*

Cut your fixture replacement, water and fuel bills with Economy Renewable Seats. Make economical, permanent repairs quickly and easily with the Junior Kit (illus.). Repair bathroom, kitchen and laundry fixtures. Everything you need included in steel box. This is a natural for the "Fixit" shops—get extra income from making permanent repairs on your customers' faucets.

Senior Master Kit also available—repairs faucets and valves up to 1" pipe.

Write for illustrated circular and prices.

ECONOMY VALVE SEAT CO.
1426 N. Keating Ave., Chicago, Ill.

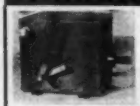
SPECIAL OFFER to Hobbyists ONLY 4.95

Hard Angle Jobs Set-up in 5 Seconds

Save TIME! MONEY! Drill, mill, grind, etc., round, square, irregular pieces at any angle—Quickly—Easily—Accurately with **PALMGREN "HOBB-E" ANGLE VISE**. Accurately machined and graduated. 1½" Jaws. 1-Plain, 1-Grooved. Order NOW! Only $4.95. Write for "Hobb-E-Tool" Circular.

CHICAGO TOOL & ENGINEERING CO.
8306 SOUTH CHICAGO AVE. CHICAGO 17, ILL.

VARIABLE SPEED HYDRAULIC POWER TRANSMISSION



It has Infinate Speeds 0 to 550 Reverse Automatic Overload Protection; Adjustable Torque up to 180 inch pounds. ⅝" Input and Output Shafts. It will handle ¼ to 1½ H.P. Motor. Case measures 7½" long 7" high 6½" wide. VALUE OVER $300. Shipping Wt. 25#. On C.O.D. Orders we require a 10% Deposit. **only $54.50 Fob. Chicago**

DIRZIUS MACHINE SHOP "V" 1423-25 So. 52nd Ave., Cicero 50, Ill.

SHARPEN CIRCULAR SAWS LIKE AN EXPERT

The Super Gadget for Home Workshop
Two simple adjustments. Gets hollow-ground, cross-cut or combination saw blades true and sharp. Fits 6" to 12" blades ⅛" to 13/16" centers. Includes file, complete instructions. $6.95 postpaid. (C.O.D. postage extra.) Guaranteed—Money back if not satisfied after 10 day trial. **Soon pays for itself.** Order today. Free folder.

$6.95

SURE SHARP MFG. CO., Dept. S-11
P. O. Box 24 Santa Ana, Calif.

BRONZE FOUNDRY

Schools and Home Workshops

Make your own castings of aluminum, copper, bronze, silver. Foundry sets are available in three sizes including 2400 Deg. F. blast Furnaces, $22.50; $29.50; and $42.00. f.o.b. Kansas City. Free Circular.

KANSAS CITY SPECIALTIES CO. P. O. BOX 6022, DEPT. S-1 KANSAS CITY, MO.

1951 BUZZ MASTER

8 MODELS — $99 up

More cutting—"Tomorrow's BUZZ MASTER Today!" See the de luxe riding model. Nothing else like it. Made by the oldest firm in the business—now in our 47th year. Many special features used only on Ottawa Saws. Write today for FREE DETAILS.

OTTAWA MFG. CO., 1-101 Brush Ave., OTTAWA, KANS.

GROBAN'S BRAND NEW **WAR SURPLUS BARGAINS** ALL FULLY GUARANTEED

DIRECT CURRENT GENERATORS

For welders, plating, truck and marine use, D.C. appliances, lights, etc. Aircraft quality—lifetime grease sealed ball bearings. Heavy duty.

ITEM #89—Type M-3, rated 50 Amps.—24 Volts. Mfd. by Leece-Neville Co. Shpg wt. 32 lbs. Gov't. Acq. Cost $176.00. F.O.B. Chicago **NOW ONLY 16.50**

ITEM #90—Type P-1, rated 300 Amps.—28 Volts, 2500 RPM. Mfd. by General Electric, Ford, Delco-Remy and Westinghouse, Gov't. Acq. Cost $300.00. Shpg. wt. 70 lbs. F.O.B. Chicago..... **22.50**

ITEM #91—Type R-1, rated 300 Amps.—30 Volts. Mfd. by Jack & Heints. Gov't. Acq. Cost $380.00. Shpg. wt. 70 lbs. F.O.B. Chicago..... **35.00**

Each individually packed in wooden box.

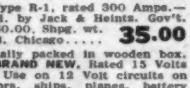
ITEM #99—BRAND NEW, Rated 15 Volts at 50 Amps. Use on 12 Volt circuits on trucks, tractors, ships, pianos, battery charges, auxiliary lights etc.

Base mounting with 4 bolt holes. ⅝" threaded shaft with keyway. Mfd. by Bendix-Eclipse. Gov't. acq. cost $136.00. Shpg. wt. 53 lbs.

F.O.B. Chicago..... **21.50**

HYDRAULIC CONTROL VALVES

ITEM #24. Four-way control valve with built-in relief valve, for use with one double action hydraulic cylinder, may be used with 1500 P.S.I. hydraulic system to open and close hydraulic cylinders. Shpg. wt. 3 lbs. A $38.00 value. post paid **9.95**



(ITEM #24)

ITEM #26. Four-way control valve for use with two hydraulic double action cylinders. Each cylinder may be operated independently of the other or in conjunction with the other. Oil may be locked in any of the cylinders to hold the piston at any required position. Ship. wt. 5 lbs. A $60 value.....postpaid **12.95**

LOGAN HEAVY DUTY HYDRAULIC PUMP

(ITEM #29)

For operating hydraulic cylinders and hydraulic motors on tractors, bulldozers, construction machines, lift trucks, industrial applications, etc. Delivers 10 GPM at 1200 RPM at 1000 P.S.I. using ⅝ HP. Has a ¾" inlet, ½" outlet. ⅝" shaft with flat and keyway for direct or pulley drive. Has flange with 4 bolt holes for convenient mounting. Ship. wt. 22 lbs. Overall dimen.: 7" L x 5½" H x 5½" W. A $105.00 value. FOR ONLY...F.O.B. Chicago **22.50**

SELF PRIMING

ALL PURPOSE PUMP

(Item #51A)

Ideal For:
- Draining Basements
- Insecticides
- Fuel Oil
- Vacuum Pump—26" for Milking Machines, Lab use, etc.
- Air Compressor—For paint spraying, etc. Delivers 6.5 CFM at 40 PSI with 1725 RPM
- Home Water Systems
- 4-Ball Bearings—½" Shaft—⅝" Ports
- Rotate in either direction
- Rated up to 10 GPM, 120 PSI
- Use with ¼ HP motor or larger, speeds from 200 to 1800 RPM
- Useful for hundreds of applications in the home, farm and factory
- Built by Pesco—Div. of Borg-Warner. Gov't. acq. cost $45.00. Shpg. wt. 12 lbs.

Free: Complete instructions and performance data with each pump. F.O.B. Chicago. NOW ONLY **16.50**

FINGERTIP SPEED CONTROL HYDRAULIC TRANSMISSION

(ITEM #115)

Use For:
- Reamer Drives
- Midget Cars
- Feed Mills
- Canning Machines
- Conveyors
- Lathes
- Milling Machines
- Motor Boats
- Cream Separators
- Garden Tractors
- Pumps, Blowers, etc.

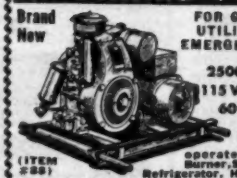
Variable output speeds ranging from 0 to input speed now available. Merely move control handle until desired speed is attained. Then turn locking handle to maintain the setting. Internal relief valves prevent overloading. Use input power of ¼ to 1½ H.P. This Westinghouse-Oil Gear Unit converted to commercial use from 40 MM anti-aircraft traversing mechanism consists of a variable displacement hydraulic pump feeding a fixed displacement hydraulic motor. These components are contained in a crackle-finish steel oil reservoir (capacity 2 qts.). Adjustable relief valves set at factory for 100 inch pounds of torque may be reset up to 160 inch pounds. Independent reverse control allows full output power and speed selection in either direction of rotation.

Both input and output shafts measure ⅝" diam., include keyway. Input rotation is counter-clockwise facing shaft. Recommended input speeds not to exceed 750 RPM. Overall dimensions. 7½"x7½"x11½". Gov't. acquisition cost, $428.00. Shipping weight 26 lbs. Complete with 2 qts. of oil and full instructions.....Postpaid **54.50**

AUXILIARY ELECTRIC A.C.

GENERATING PLANT

Brand New



(ITEM #88)

FOR GENERAL UTILITY AND EMERGENCY USE

2500 WATTS—115 VOLTS A.C. 60 CYCLES

Plenty of current to operate your: Oil Burner, Sump Pump, Refrigerator, Home Freezer, Power Saw, Lights, Radio and Television, Home Water System Pumps.

Complete integrated heavy duty electric power plant, Signal Corps Model PE-75, driven by Briggs & Stratton, one cylinder 6½ H.P. Model ZZ, 4-cycle engine with killer button, oil bath air cleaner, governor, muffler, starting rope, and radio interference filter.

The self-excited Leland generator is rated 2500 Watts, 115 Volts, 60 Cycle A.C. single phase, belt driven, with guard and duplex receptacle.

When generator is not in use, you can use the engine separately to power other equipment.

Mounted on adjustable steel skids, notched for carrying poles. Net wt. 310 lbs. Shpg. wt. 440 lbs. Dimen. 36"x-19½"x24". 12 month guarantee. $726.00 value...NOW F.O.B. Chicago..... **295.00**

FREE: 1951 CATALOG

New 48-page catalog listing Brand New War Surplus bargains including Aircraft Quality hydraulics, A.C. generators, pumps, welders, tanks, and many, many others. You save on everything! Write for yours today!

ORDER DIRECT FROM AD

Send Payment or Purchase Order Today

SATISFACTION GUARANTEED

HYDRAULIC CYLINDERS • AIR or OIL

Large supply of new labor-saving, economical hydraulic equipment in many types and sizes. Use these positive, highly efficient, smooth pressure hydraulics on presses, arbors, lifts, loaders, power control, positioning, brakes, plastic dies, auto frame alignment, etc., etc.

ITEM #70—Purolator hydraulic oil filter. Permanent element type. ⅜" female pipe thread ports. Capacity. 16 gallons per minute. A $12.00 value. Now Postpaid **4.95**

ITEM #4—All steel double action hydraulic cylinder, 1½" bore, 2½" stroke. Clevis mounting. Will lift 1000 lbs. with 1000 P.S.I. line pressure. Perfect for positioning and feeding movements. Shpg. wt. 4 lbs. Postpaid..... **4.95**

ITEM #33C—Double action hydraulic cylinder, 1½" bore, 4½" stroke. Clevis mountings at both ends. Uses ¼" pipe fittings. Postpaid..... **8.95**

ITEM #32—Double action, 1½" bore, 9" stroke, will lift 1760 lbs. with 1000 P.S.I. line pressure. Wt. 7 lbs. A $45.00 value. Postpaid..... **10.95**

ITEM #41—Double action hydraulic cylinder, 2" bore, 6" stroke, clevis mounting at base and end of shaft. Overall length closed 12½". Has ¾" stainless steel shaft, uses ¼" tubing fittings. Will lift up to 3100 lbs. with 1000 P.S.I. line pressure. Wt. 7 lbs. Postpaid **12.50**

ITEM #16C—Double acting hydraulic cylinder, 1½" bore, 26" stroke. Will lift 1760 lbs. with 1000 P.S.I. line pressure. Weight 8 lbs. $35.00 value Now Only..... Postpaid **16.95**

ITEM #103—Double acting hydraulic cylinder, 2½" bore, 17" stroke. Clevis mounting. Will lift 4900 lbs. with 1000 P.S.I. line pressure. 1¼" diam. shaft, ⅝" tubing thread ports. Overall length closed 28". Shpg. wt. 11 lbs. F.O.B. Chicago **21.50**

ITEM #31C—Double action hydraulic cylinder, 3½" bore, 11" stroke. Aluminum alloy cylinder wall and all steel 1¼" diameter piston rod. Clevis mounting at base and shaft. 19½" overall length closed. Will lift 9625 lbs. using 1000 P.S.I from Logan Heavy Duty Hydraulic Pump. Uses ⅝" tubing fittings. Value $103.00. Shpg. wt. 11 lbs. F.O.B. Chicago **22.50**

ITEM #64A—Double action hydraulic cylinder, 3" bore, 25" stroke, will lift 7070 lbs. with 1000 P.S.I. line pressure. Steel barrel, 1½" stainless steel shaft. Gov't. acq. cost, $176.00. Shpg. wt. 26 lbs. F.O.B. Chicago..... **28.00**

ITEM #42—Double action hydraulic cylinder, 4" bore, 18" stroke. Rated lift capacity with 1000 P.S.I. line pressure is 12,560 lbs. Shpg. wt. 30 lbs. AN EXCELLENT BUY. F.O.B. Chicago..... **32.50**

NEW! STATIONARY OR PORTABLE

D.C. ARC WELDER

250 AMPS. MODEL 252

(Item #68)

FOR ANY WELDING JOB, LIGHT OR HEAVY

Stop Costly Repair Bills, Weld It Yourself and Save

Only one or two jobs will pay for entire welder.

Designed for many years of trouble-free service. This precision engineered Direct Current ELECTRIC ARC WELDER is offered at but a fraction of its original value. It can be mounted permanently or easily transported for portable use. Does the job instantly where and when you need it. Has dial type rheostat for easy pinpoint control and a high-low range switch. Run welder at 2500 RPM from drive pulley or power take-off of tractor, a 7½ HP electric motor or a 10 HP gas engine. Use two V belts or flat belt (on pulley).

Now . . . AT A FRACTION OF ITS VALUE. Price includes double V or flat belt pulley and instruction book. Shipping wt. 107 lbs. F.O.B. Chicago..... **99.50**

GROBAN SUPPLY CO., Inc., 1507 S. MICHIGAN AVE., Chicago 5, Ill., Dept. PS-1

I built my own Garage on weekends with

SKIL Home Shop Tools

A new porch, an attic room, needed repairs, are easy and economical with SKIL Home Shop Tools!

No project is too big or difficult for *you* with SKIL Home Shop Tools to help. SKIL Home Shop Saws cut wood and wallboard *fast and true*. Safe . . . easy-to-use even by beginners and so inexpensive they pay for themselves on a single job.

SKIL Home Shop 6 inch Saw
Bevel cuts! Adjustable—¾" to 1⅞"
Perfect for repairs, remodeling, hobbies!
Model 520 $59.30

SKIL Home Shop 8¼ inch Saw
Bevel-cuts! Adjustable!
Rips, cross-cuts, bevel-cuts 2 x 4's, 2 x 6's, 2 x 8's.
Model 565 $84.50

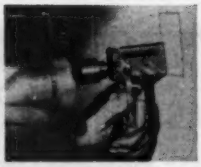
SKIL Home Shop Saw Table
Converts SKIL Home Shop Saw to a tilting arbor saw. Sturdy, accurate, economical.
Model 497 $29.95

Ask your dealer about these other SKIL Home Shop Tools
• ¼ and ½ inch Drills • Sander-Polisher • Bench Stands • Drill Kits • 2¼" Belt Sander • SKIL Trimmer

SKIL home shop Tools

Products of the Home Shop Division
SKILSAW, INC.
Made by the makers of world-famed SKIL Tools for industry.

SKILSAW, INC. D-1
Home Shop Division
5033 Elston Ave. • Chicago 30, Ill.
Please send me full information on SKIL Home Shop Tools and the name of my nearest dealer.
Name.....
Address.....
City.....*Zone*.....*State*.....



Absolutely NEW!

"The Mighty Little Midget"

BULL HACK SAW

ONLY $4.95

Fits any ¼" electric drill or drill press. Weighs only 11 ozs.; small in size—easy to carry, easy to use. 2-to-1 ratio of drill speed to saw speed for extra power! No gears, no bearings, nothing to wear out. Full chip clearance on any wood, metal or plastic stock up to ¾". Powerful, portable, pocket-size—a must for every home craftsman, only $4.95.
LIFETIME GUARANTEE: At any time, we guarantee to put this tool in perfect working order for a handling charge of 75c.

BERTRUM E. ENGINEERING & SUPPLY CO.
3121 Main Street **Kansas City, Mo.**

Saw, Drill & Grind

without stopping, lifting machine or changing set-ups; only one change for lathe work and sanding. No heavy lifting. Basic Emrick 5-in-1 Machine still only $39.95. **10-day Free trial; Money-Back Guarantee.** Write for FREE Catalog of entire line.

EMRICK, INC., 211 Clinton, Kalamazoo, Michigan

HANDY CALCULATOR FOR WOODWORKERS.. ONLY 10c

Just set dial, quickly solves countless problems. Converts linear to board feet, compares workability of various woods, shows bit sizes, nail specifications. Also tool sharpening tips, etc. 6" diameter heavily varnished cardboard. Send 10c to Greenlee Tool Co. 2121 Columbia Av., Rockford, Ill.

SAW SHARPENER

Table model, gums and sharpens rip saws, combination saws & cut-off saws. Ideal for "Skilsaw" blades. Cap. 4" to 20" diam. Complete with ¼ h.p. motor & 1 grinding wheel & cord—$64 f.o.b. Portland. Shipping weight, 63#. SEND FOR FREE LITERATURE.

P. T. HOBBS MACHINERY
8375 N. Interstate, PS-11, Portland 17, Ore.

DESIGNED FOR THE HOME WORKSHOP

A penny postcard will bring you a folder showing in use the most versatile wood-working vise (the Versa-Vise) you ever imagined. Use it upright, flat on its side, turned to any angle! Mail a card **now.**

THE WILL-BURT CO.
Dept. PS-3 **Orrville, Ohio**

Direct Current GENERATORS

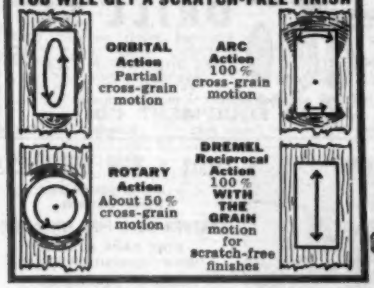
FOR ANY WELDING JOB, LIGHT OR HEAVY, plating, truck, or D.C. Appliances. PORTABLE AND RURAL LIGHTING, or power plant. Heavy duty, aircraft quality, air cooled commutator, and lifetime grease sealed ball bearings.
Stock No. 511—Type F-2 rated 200 amps. 28 Volts. Mfg. by Eclipse-Bendix. Gov't acq. cost approx. $300.
NEW, ONLY..... **$21.50**
Used, but in guaranteed condition—ONLY.....$15.50
Build your own LIGHT PLANT HEAVY DUTY CAP. LOAD 5000 Watts the easy, inexpensive way. Simple instruction included & diagram for Gen. #511 (save over $300).
Stock No. 507—Type R-1, rated 300 amps. 28 Volts. Mfg. by Jack & Heintz. Gov't acq. cost over $350. New, only **$32.50**
Used, but guaranteed.....$16.50
Make your own ARC HEAVY DUTY WELDER the easy inexpensive way of continuous welding, rating 200-300 amps. Simple instruction included. for F-2 and R-1 types. Send check or money order. Prices F.O.B., Kansas City, Mo. Ship. wt. approx. 60 lbs.
General Salvage Company 2922 E. 27 St., Dept. 271, Kansas City, Mo.

CHOOSE THE MODEL BEST FOR YOU!

Two DREMEL STRAIGHT-LINE SANDERS

STRAIGHT LINE Action for Guaranteed SCRATCH-FREE Surfaces

BEFORE YOU BUY ANY SANDER—BE SURE YOU WILL GET A SCRATCH-FREE FINISH



OTHER DREMEL FEATURES (In both Model "A" and Model 2000)

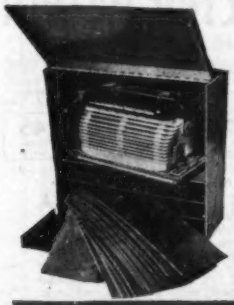
Only 2 moving parts ● requires no oiling ● dust-proof ● cam-type holder permits paper change in seconds ● 8 ft. cord . . . operates on 110-120 v. 60 cycle A.C. . . . fully guaranteed.

(PATENTED)

14,400 SANDING STROKES PER MINUTE

FOR HEAVY-DUTY CRAFT AND WOOD WORKING PROJECTS

The new Model 2000 is a fast-cutting production sander. It has the added stroke and power required for furniture and cabinet making, boat building or refinishing, resurfacing large area table-tops, sanding plastic, leather, etc. Great for building operations in sanding woodwork, stair treads, dry wall joints, siding and other exterior surfaces. Does a superb wax polishing job, too! Weighs only 5 lbs. yet has 21 sq. in. sanding surface. Over-all size 3⅛" x 4½" x 7".



MODEL 2000 PRICE INCLUDES THIS STEEL CARRYING CASE

—Easy portability assured with this all steel storage case. Price also includes 25 assorted sheets abrasive paper, and a sheepskin polishing pad.

FOR HOBBY WORK, REFINISHING AND REDECORATING . . . .

Dremel Model "A" Sander saves time and labor for hobbyists, home-owners and housewives. **Over a quarter million now in use** for sanding woodwork, cabinets, wood and plastic models, unfinished furniture, workshop projects, etc. Easy to handle—weighs only 2½ lbs. Takes all the drudgery out of polishing any waxed surface. Sanding pad 2¼" x 5½". Furnished with 6 sheets sandpaper, 1 sheepskin, 1 felt pad.

WHERE TO BUY DREMEL TOOLS

Dremel Tools are sold everywhere. If your dealer cannot supply you, send remittance in full and we will ship postpaid. Or send only $2, and pay postman balance plus postage and C.O.D. fee. **Money back if not delighted after 5 days' trial.**

FUN FOR BOYS FROM 8 TO 80

DREMEL JIGSAW

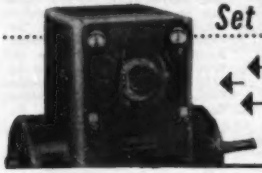
CUTS SCROLLS LIKE MAGIC—SANDS AS IT SAWS

JUST GUIDE IT!

. . . for 6 useful projects packed with each saw.

SAFE! AS A HANDSAW

For home, hobby, repair work—no other tool pleases so much for so little cost. Works in any direction—delivers 7,200 strokes per minute smoothly, effortlessly. Saws through ⅝" medium-hard wood at a foot-a-minute speed. Touch-of-the-trigger, foolproof action. Only 2 moving parts, never needs oiling. Uses 110-120 v. A.C.



Set Up Your Own Welding Business—Save $300 to $500

Get Into Big Profits on Repair and Contract Work

"Build Your Own" big capacity arc welder and save! This HOBART generator plus your own hook-up builds a welder that will earn hundreds of extra dollars for you.

Let Hobart help you "build your own" welder and save $300 to $500 over cost of factory-built unit. Select the type and capacity generator you want from our complete line and belt or couple to a good used auto engine. Don't miss this opportunity. Write for FREE booklet.

HOBART

HOBART BROTHERS CO., BOX P-11, - TROY, OHIO

"One of the world's largest builders of arc welders"

NEW! FOREDOM Model #100 at an Amazing LOW PRICE

$17.75 COMPLETE WITH MOTOR

FLEXIBLE SHAFT MACHINE with PENCIL-SIZE HANDPIECE

The choice of tens of thousands because: — Pencil-size handpiece provides positive, sensitive, finger-tip control, works in hard-to-reach places. Your work always well in view. Precision construction and silencer-equipped flexible shaft assures smooth-running performance. Motor not dwarfed to fit the hand, hence more power, longer motor life. Buy the Foredom Model 100 Flexible Shaft Machine. Price only $17.75. Foot rheostat $5.25 extra.

Use it to GRIND, POLISH, DRILL, SAW, SAND, CARVE, MILL, CLEAN, ETCH, ENGRAVE, etc. on all metals, wood, plastics, glass, leather, linoleum, etc.

ORDER TODAY

Send check or money order for items above or sent C.O.D. plus postage. Sold on 10 day money back TRIAL. Write today for FREE CATALOG No. 1037-E.

Name.....

Address.....

City & Zone.....State.....

FOREDOM ELECTRIC CO.
27 Park Place, Dept. 1037-E, New York 7, N. Y.

For Loose Caster Guides

Remove the guide, fill the hole with a putty-like mixture of Smooth-On No. 1 Iron Cement and drive the guide back in. It will stay in place, because Smooth-On, in hardening, expands slightly and takes hold tight. Use Smooth-On for tightening other loose parts and also for stopping leaks in boilers, furnaces, piping, radiators, etc. Buy Smooth-On No. 1 in 1¾ oz., 7 oz. and 1 lb. size at your hardware store. If they haven't it, write us.

FREE Repair Handbook

Shows how to save time and money, making many household repairs. 40 pages. 170 pictures. Clear directions. Send today.

SO-313

SMOOTH-ON MFG. CO., Dept. 58H
570 Communipaw Ave., Jersey City 4, N. J.

Do it with

SMOOTH-ON

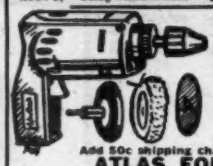
THE IRON CEMENT OF 1000 USES

Make Your Own

POWER LAWN MOWER

with this DRIVE CUTTER ASSEMBLY

Complete with 18" blade and double ball bearing drive, only..... **$11.95**



GENUINE MALL
¼" Electric 110 Volt AC

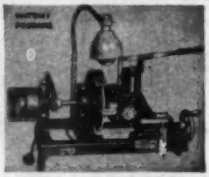
DRILL SET

Special with sander and polisher and 9 Drill Bits. All for **$17.95**

ALL PRICES FOB. K. C.
SEND CHK. OR M. O.

Add 50c shipping charges to the above items.

ATLAS EQUIPMENT CO.
229 S.W. Blvd. Dept. PS1 Kansas City, Mo.



Start a NEW BUSINESS!

or Add to your present Repair Business

SHARPEN DULL PIPE WRENCHES

PIPE TAPS & DIES
"GUM" CIRCULAR SAWS

Write for Information

J. C. MOORE INDUSTRIES
BOX S 276, Fredonia, Pa.

BUILD HEAVY DUTY MACHINES

SAVE UP to 90%

You can build, using our practical, easy-to-read plans, all kinds of machines, for home, farm or shop—scooters, portable sawmills, metal working machines, concrete machinery of all kinds, printing equipment, woodworking machines, midget autos, dish washers, farm equipment, freezers, tractors.

FREE CATALOG HANDBOOK
183 SETS OF PLANS
VALUABLE INFORMATION

NICHOLS EQUIPMENT COMPANY
Dept. D-10 PURVIS, MISS.

ELECTRIC WELDER

AC or DC 110 Volts

"The Little Marvel" All-Metal welder. 5-year written guarantee. Welds ⅛" thick metal or money back. Repairs tanks, tools, fenders, machine parts, etc. Comes complete with everything—rods, unit, eye shield, and directions. We also make a welder for 16 to 22 gauge metal kit $15.95. On C.O.D., postage extra. $3.95 complete. Transformer welder

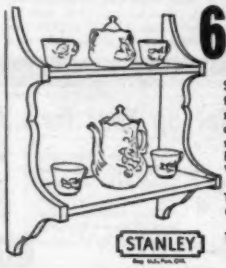
$6.45 Complete

ESSAY MFG. CO., Inc., Dept. 47, Quincy 69, Mass.

Print Your Own

Cards, Stationery, Advertising, labels, circulars, photo and movie titles, church work, tags, etc. Save money. Sold direct from factory only. Raised printing like engraving, too. **Print for Others, Good Profit.** Have a home print shop. Easy rules supplied. Pays for itself in a short time. Write for free catalog of outfits and all details.

KELSEY PRESSES, N-33, Meriden, Ct.



6 EASY WOODWORKING PATTERNS . . . 25¢

Six woodworking patterns for attractive, easy-to-make projects. Actual size. Simple to follow, trace and cut out. Set includes: Wall Shelf (illustrated), Pipe Rack, Phone Holder, Plant Bracket, Novelty Table and Wall Plaque. All six patterns for only 25c, postpaid. Send to Stanley Tools, 211 Elm St., New Britain, Connecticut.

STANLEY

THE TOOL BOX OF THE WORLD

SURPLUS MACHINE SHOP TOOLS AT PRICES YOU CAN AFFORD

HIGH SPEED STRAIGHT SHANK DRILLS

SET 1J — 30 Selected High Speed Straight Shank Drills from 1/8" to 1/4". $15 value. New and slightly used surplus. Priced at only **$2.95**

SET 2J — 10 Different Size High Speed Straight Shank Drills from 1/2 to 1/2". Extra Long Drills. $30 value. Priced at only **$3.95**

SET 3J — 10 Different Size High Speed Straight Shank Drills from 1/2 to 1". Extra Long Drills. $40 value. New and slightly used surplus **$6.95**

HIGH SPEED MORSE TAPER SHANK DRILLS

SET 4J — 15 Different Size High Speed Morse Taper Shank Drills up to 9/16" with No. 1 and 2 tapers. $50 value. Priced at only **$6.49**

SET 5J — 20 Different Size High Speed Morse Taper Shank Drills from 1/4" to 1". $70 value. Priced at only **$12.95**

SET 6J — 10 Different Size High Speed Morse Taper Shank Drills from 1/2" to 1 1/4". $50 value. Priced at only **$9.95**

SET 7J — 10 Different Size High Speed Morse Taper Shank Drills from 1" to 2" with No. 3, 4 and 5 tapers. $180 value. Priced at only **$39.95**

HIGH SPEED TAPER SHANK CHUCKING REAMERS

SET 8J — 20 Different Size High Speed Morse Taper Shank Chucking Reamers up to 1/2" with No. 1 and 2 tapers. Priced at only **$6.95**

SET 9J — 8 Different Size High Speed Morse Taper Shank Chucking Reamers from 1/4 to 1". Priced at only **$4.95**

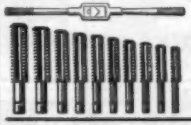
SET 10J — 10 Different Size High Speed Morse Taper Shank Chucking Reamers from 1/2" to 1 1/2". $65 value. Priced at only **$9.95**

HIGH SPEED STRAIGHT SHANK CHUCKING REAMERS

SET 11J — 20 Different Size High Speed Straight Shank Chucking Reamers up to 1/2". Priced at only **$6.95**

SET 12J — 10 Different Size High Speed Straight Shank Chucking Reamers from 1/2" to 1 1/2". Priced at only **$9.95**

SET 13J — 15 Different Size High Speed Straight Shank Chucking Reamers from 1/4" to 1". Priced at only **$6.95**



HIGH SPEED HAND TAPS

SET 14J — 10 Different Size High Speed Standard Thread Hand Taps up to 3/4". Plus No. 6 Tap Handle (5/32-3/4 Cap) Priced Complete at only **$5.49**

★ **Money Back Guarantee—All Mdse. Mixture of New and Reconditioned Tools Unless Specified Brand New—All Orders Shipped Post Paid Saving You up to 25% on Total Delivered Cost.**

HAND REAMERS & TAP HANDLE

SET 15J — 10 Different Size Hand Reamers from 1/4"-1". Majority Brand New Plus No. 6 Tap Handle (5/32"-3/4" Cap) $30 Value. Only **$9.95**

SET 16J — 20 Different Size Hand Reamers as above with Same Tap Handle. Only **$16.95**

BRAND NEW HIGH SPEED COMBINATION DRILL AND COUNTERSINKS

SET 17J — 8 Different Size from C2 to M1 (1/16 drill x 13/64 body to 7/32 drill x 5/8 body) 60 degree of countersink. These new countersinks sell new from 75c to $2.50 each. Your price for this set of 8, while they last, only **$3.95**

HIGH SPEED MILLING CUTTERS

SIDE MILLING CUTTERS

Dia.	Width	Arbor Hole	Price Each
2"	1/8"	5/8"	$1.20
2"	3/16"	5/8"	1.25

STAGGERED TOOTH MILLING CUTTERS

Dia.	Width	Arbor Hole	Price Each
4"	5/16"	1 1/4"	$3.95

HYDRAULIC DEPARTMENT

Brand New Vicker's MF10 HYDRAULIC PUMP OR MOTOR

COMPLETE WITH MOUNTING KIT—READY TO INSTALL

$100 Value

Pump is Compact, Powerful, Rated 1000 P.S.I., .600 Cu. In. Per Rev. 8 Gals. Per Min. at 3750 R.P.M. Change Rotation by Reversing Flow. Delivers up to 6 H.P. Requires 1/2 to 5 H.P. to drive directly or by pulley.

Mounting Bracket contains Oilite Bearing on Pump End and Needle Bearing on Bracket End. Shaft 7/16" Key Seated, 1 1/4" dia. 6-Tooth Drive Sprocket. Adaptable for any size Pulley or Gear.

Complete Only $14.95

Large Stock; Discounts on Quantity Orders

PESCO HYDRAULIC GEAR TYPE PUMP

Rated at 3 GPM @ 3750 RPM, @ 1000 PSI Female type Drive **$6.98**

Discounts on Quantities

PRESSURE GAUGE

0-1000 lbs., 2 1/2" dial, 1/4" Bot. Pipe Conn. Mfg. US Gauge **$1.95**

T & T TOOL 111 W. ARCHER TULSA, OKLA.

BARRON Drill Press TOOLS

ROTARY WOOD PLANER $7.50

1" and 2 1/2" DRUM SANDERS

ROTARY SURFACE SANDER $5.95

$10.85 F.O.B. Detroit ALL-METAL DRILL PRESS TABLE

ALL-METAL SHAPER FENCE $9.50 F.O.B. Detroit

ROUTER & MORTISING BITS $10.50 set of six 1/4" to 1/2"

SHAPER CUTTERS $5.75 Inc. 4 Blades for Shaper or Drill Press

15 ESSENTIAL WORKSHOP OPERATIONS . . .

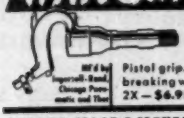
You can convert any standard make drill press into your most versatile, useful, low cost workshop tool. Barron Precision Tools now enable you to perform 15 indispensable shop operations—surface-plane woods and plastics — rabbet — tenon — panel — bead — groove — bevel — mortise — route — cut dovetail — sand surfaces and contours — shape — cut moldings—grind and buff. Over 200,000 Barron Tool users. Every tool sold on full 10 day money back guarantee.

See Your Dealer . . . Or Write Direct

BARRON TOOL COMPANY, INC.
326 Architects Bldg., Detroit 1, Mich.

FREE Workshop Guide & Catalog

WAR SURPLUS AND OTHER BARGAINS



PNEUMATIC RIVETER & CHIPPING HAMMER

Pistol grip. Ideal for fender, brake lining, concrete breaking work. Weight 5 lbs. Like new. Price each. . 2X—$6.95 3X—$7.50 4X—$8.50

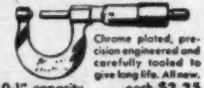
INSIDE MICROMETER 2" to 8"

Precision made of tool steel. Hardened tips on all six measuring rods. One ½" spacer. Chrome finish. Complete with case. $6.95

FANCY BRIAR PIPES

We have been awarded 100,000 fancy briar pipes by Quartermaster Corps. Assorted shapes and sizes. All popular makes. Buy now for Christmas Gifts . . . Set of 7, $3.50

MICROMETERS



Chrome plated, precision engineered and carefully tooled to give long life. All new.

0-1" capacity . . . each $2.25
1-2" capacity . . . each 3.50
2-3" capacity . . . each 5.50
3-4" capacity . . . each 6.50

DRILL GRINDER

All New. $2.80 each.

. . . Sharpens round, square or tapered drills up to 6" long. Even an amateur mechanic can get a new, factory finish on a drill in 25 seconds. New protractor feature gives every drill sharpening angle, with 3 convenient angles already marked off. Usable with hand or power stone. A brand new development, manufactured by Ten Eyck. Shipped postpaid

HIGH SPEED DRILLS

All New. Fractional & numbered. Orig. Val. $15. Nationally known brand. Asstd. sizes. Set 30, $3.50

EXTENSION DRILLS

High Speed Steel, like new. Asst'd sizes from No. ¼ to 40. Lengths from 6" to 12". Approximately $20 value. Set of 12 . . . . . $3.75

ELECTRIC BELLS—Vibrating type, high pitch. 115 V., 60 Cycle. Ideal for use indoors or outdoors—on ranches, for schools, plant installations, as signal systems, burglar alarm systems, etc. Nationally known Mfr. ALL NEW in orig. Pkgs. Solid brass clapper & 8½" gong. Wt. 8 lbs. Govt. cost about $67.50. Close out at . . . $7.95

Send check, money order or cash. 25% deposit required on C.O.D. orders. All prices F.O.B. Culver City, California, unless otherwise stated.

Send 25c for Illustrated Catalog.

AIRBORNE SALES CO., INC. DEPT. PSM 1-51 CULVER CITY, CALIF.

COMPARE THIS !! $39.95

300 AMP.-D.C.-WELDER KIT
ASSEMBLE YOUR OWN — SAVE HALF!

Never Before At Such An Unbelievable Low Price!

Now you can make your own welder using any aircraft generator and save many dollars. Only a pair of pliers and a few minutes are needed to assemble this kit into a sturdy welder giving you many years of useful service. Satisfaction guaranteed.

HERE'S WHAT YOU GET: No. AW5-Kit includes Special Hook-up Leads, Amperage control with leads, Mounting Plate, Pillow Bearings, Bearing Supports, Shaft Extension, Flexible Coupling splined to fit your generator, Triple Groove "B" Type Pulley. Plan included. No. AW5-Kit Complete **$39.95**

No. AW6 Includes AW5-Kit above plus Arc Stabilizer—$49.95

No. AW7 Includes AW6-Kit above plus R-1-300 Amp. Gen.—$67.90 (R-1 Generator Cost Gov't. approx. $400.00)

EXTRA! A $15.95 Accessory Kit Complete for only $10.95! Includes Welding Helmet, Electrode Holder, 5 lbs. Ass't. Rods, Two 10 ft. Welding Leads with Terminals and ground clips, plus Audel's Welding Guide. Special Price **$10.95**

PLANS 35c LeJay's proven plan for building your own Welder using aircraft generator. Catalog included.

Order Direct from This Ad
FREE! BIG NEW CATALOG OF ELECTRICAL BARGAINS—WRITE FOR IT!

LEJAY MFG. CO. 923 LEJAY BUILDING MINNEAPOLIS 8, MINN.

BeMaCo Dependable

AUTOMATIC SAW SET

Sets 400 teeth per minute on band or hand saws 4 to 16 point. Hammer and anvil action sets teeth accurately and uniformly . . . No tooth breakage. Does a perfect job. Used profitably by saw shops everywhere and saw manufacturers. Every machine guaranteed!

FAST - ACCURATE - DEPENDABLE

★INCREASES PROFITS

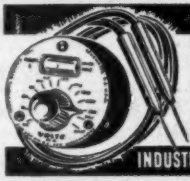
BEAVER MFG. CO.
SAW MACHINE Div. 4A
800 SOUTH ISIS AVE. • INGLEWOOD, CALIF.

MACHINE SHOP EQUIPMENT

● The No. 49 edition of the famous Center Tool Co. Catalog is now ready! Every workshop owner should have a copy. 240 pages full of illustrations, descriptions, and prices of the latest tools made by best known manufacturers in U. S. You pay the cost of printing—50c. We refund your 50c with your first order of $10.00 or more. Prompt delivery on most tools. Send check or money order today!

"CENTER TOOL CO.
153 Centre Street, Dept. D, New York 13

1,001 USES!



Turn the knob—read the voltage. Indicates whether AC or DC. On DC indicates polarity. Picks up 2 volt drop at 110 V. Measures from 65-660 V. Virtually burnout-proof. Guaranteed for 25,000 hours' use. Rugged! Throw it in with tools. 12" flexible test leads and prods. Not a gadget, but a proven tool. At your dealer's or postpaid $3.00

INDUSTRIAL DEVICES, INC., EDGEWATER 2, N. J.

New WOOD SAMPLE KIT

Only $8.50

The only wood study kit on the market. Contains 54 wood and wood products specimens size ⅝"x 2¼"x 5", an 84-page identifying manual with 51 magnified cross sections; a 10-power hand lens and knife. Send this ad and only $8.50 today for delivery any place in continental U. S.

TIMBER ENGINEERING COMPANY
1319 18th ST., N. W., WASHINGTON 6, D. C.

NEWEST OTTAWA LOG SAW

SELF-PROPELLED—MOVES ANYWHERE on OWN POWER

World's fastest Log Saw. Powerful 6 H-P air-cooled motor. Attachments for sawing down trees, buzzing limbs, post hole digging and pulley for belt jobs. Big demand for wood, pulp, posts. Make big money sawing wood this easy way. Low factory-to-user prices. Nothing like it. FREE details.

OTTAWA MFG. CO., 7-101 Pine St., Ottawa, Kansas

Now . . . MEASURE CURVED LINES!

½ Actual Size

Simply hold instrument vertically and trace line or distance to be measured. The index hand on dial shows exact length of measured distance in centimeters or inches. (Multiply for feet, yards or miles).

IDEAL FOR: Motorists, architects, draftsmen, engineers, craftsmen, machinists, engravers, artists, photographers, teachers, students, decorators, hobbyists, designers, textile men, etc.

Comes in genuine leather sheath
10 DAY MONEY BACK GUARANTEE

- Watch type. Has 2 faces—1 on front, 1 on back
- Precision made (imported)
- Highest quality material
- Chrome finish
- Unbreakable lenses

$3.75 ea.

Dealers Inquiries Welcome

Send Check or Money Order to:
ALVIN CO. Importers, Windsor, Conn.
"QUALITY AT THE RIGHT PRICE"

IT'S NEW!
IT'S DIFFERENT!

2 SPEED 100° ANGLE

BUFFING AND SANDING ATTACHMENT

Fits any ¼" Electric Drill

Polishes cars . . . waxes furniture buffs metalware . . . sands floors removes paint.

It's the new Millers Falls No. 2120 and loaded with new and better features to help you make tough jobs easy. Drives from either end — gives you work speed ½ or twice drill speed. Exclusive 100° angle drive allows clearance for drill and cord on flat surfaces. Head swivels to any position for tight corners. One of the handiest tools a man can own. Makes any ¼" electric drill an efficient buffer and disc sander. Ask for it at your hardware dealers.

$8.45* complete with 5" rubber pad, 2 5" sanding discs and lamb's wool bonnet.

*Price slightly higher in the West and Canada

MILLERS FALLS TOOLS
SINCE 1868

MILLERS FALLS COMPANY GREENFIELD

Never before - SO MUCH SAW for SO LITTLE MONEY!

Completely NEW DURO
8" Ball Bearing Tilt Arbor Saw

$46.50

C-3013—New 8" Tilt Arbor Bench Model saw. With motor pulley, V-belt and 8" comb. blade. Less extensions, switch and motor. $46.50 retail.

CG-3013—New 8" Tilt Arbor Bench Model saw with cast iron grilled extensions, as shown. With motor pulley, V-belt, 8" comb. blade. Less motor and switch $52.95

Enjoy the thrill of working with a husky, extra-capacity *tilting arbor design* saw . . . for little more than you'd expect to pay for an ordinary saw! This new ball bearing saw is BIG in everything but price. There is a full 7⅜" ahead of the blade, it makes cuts up to 2⅝" in depth. With grilled extensions the work table measures 26" x 17⅛". The new Duro arbor lock tilts and locks the blade just where you want it . . . instantly, safely.

EXCLUSIVE NEW DURO MOTOR PULLEY allows the belt to adjust itself to the angle of the saw blade. You get more positive drive . . . less belt twist . . . longer belt life. In addition, an interchangeable sleeve permits use of this new pulley on either ½" or ⅝" motor shafts.

Write Today!
for details and specifications on this new Duro 8" Tilt Arbor Saw.

DURO METAL PRODUCTS CO.
2671 N. Kildare Ave., Chicago 39

DURO METAL PRODUCTS CO.
2671 N. Kildare Ave., Chicago 39, Ill.
Please send me: Full details about the new Duro 8" Tilt Arbor Saw.

Name.....
Address.....
City..... Zone..... State.....
Dealer's Name.....

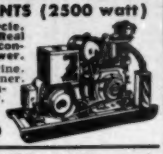
SAVE UP TO 60%! GIGANTIC MAIL SALE!

COMPLETE BARGAIN CATALOG Order from ad. Satisfaction guar. Or, rush card for big free catalog.

Power Plants · Welders · Pumps · Compressors · Tools

WE PAY SHIPPING COSTS

A-C POWER PLANTS (2500 watt)



New 110-volt, 60-cycle, Army's finest plant. Real buy, ideal for farmers, contractors, camps, city power.

- Briggs 6.5 h.p. engine. Leland self-excited gener. Automatic voltage regulation. Easy starting.
- Tools, spare parts, full instruction manual.

$726.00 value.... **$289.20**

A-C POWER PLANTS (1400-watt)

New homelite plant, complete, original crate, with tools, parts, manual. 115-v. 460-c. 1400-w . . . . and 400-w. at 27-v. D.C. 4 h.p. engine. Ideal for 115-v. lights, heaters, radio-campers, contractors, etc. Cannot be used for 60-c. motors. Cost Gov't. 3645.00..... **129.60**

A-C GENERATORS

5000-w, 115-v, 60-c, single phase A-C Hobart. Complete ready to use..... **$229.70**

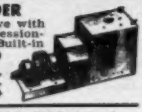
AIR COMPRESSOR KIT

Build portable hi-pressure (up to 150 lbs.) air unit. Basic kit consists best 1-cyl. piston compressor, stainless 12"x24" tank, 160-lb. gauge, genuine Brown paint spray gun, dust blow gun, tire chuck, 15' hose, fittings and manual "How to Build." Guaranteed. Brand new..... **$36.90**

AIR COMPONENTS

- **Compressors.** Sing. Cyl. Smith. Pressures to 150 lbs. at 8 C.f.m. Top quality..... **$18.15**
- **Regulators.** Adjustable 20 to 150 lbs. **$2.49**
- **Hose** (15') Finest Rubber ½" fittings. **$1.99**
- **Tanks** 12"x24" 400 lb. stainless **$8.95**
- **Guns.** Planet dust blow. ...**$1.21**
- **Guns.** Heavy Duty paint. ...**$8.95**
- **Switch.** Automatic pressure, adjustable. **$4.95**

D-C ARC WELDER



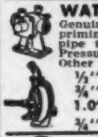
0-250 amps. Easy to drive with tractor, engine, etc. Professional outfit. Ready to use. Built-in controls, reactor..... **$89.90**

- Unit with G.E. helmet, rod holders, rods, cables, clamps, etc. $300. value. **$104.50**

WELDING GENERATOR (200 Amp.)

Excellent direct current generator with full instructions for use as welder. Includes heat control, cooling fan, etc. Type P-1. Delco-Remy. 30-v. Cost $296. **$29.89**

WATER PUMPS and SYSTEMS



Genuine brand new Burdex bronze self priming all purpose water pumps. Std. pipe threads. Will lift up to 22 ft. Pressures to 30 lbs. Up to 22 g.p.m. Other pumps up to 150 lbs.

½" BRONZE	$12.75
¾" BRONZE	16.95
1.0" BRONZE	22.95
¾" CENTRIFUGAL	6.85

POWER & HAND WINCHES

- Amazing Values. Jeep winches 80 to 1 ratio. 5,000 lb. capacity. Mounts on front trucks, jeeps, cars. Cost over $150.00. (NEW)..... **$21.95**
- Finest Steel Hand Winch. Powerful unit complete with 50 ft. 3,000 lb. cable. Complete with crank. $50.00 value. (New)..... **$29.95**

FLEXIBLE GUY and TURNBUCKLE UNITS

- New 12-ft. flexible steel cable with 14-in. turnbuckle.
- 7-strand ⅛" galv. steel wire cable, 1000-lb. strength.
- Hundreds uses on farms, for business, contractors, etc.
- Guy — strengthen — gates, fences, buildings, wagons, etc.
- Ideal guy for television towers, many other uses.
- Cost Gov't. $1.10 ea.

SALE

10 for	$ 3.89
50 for	16.47
100 for	29.32

MISCELLANEOUS BARGAINS

"We pay shipping costs on everything"

A. Utility Clutch up to 6.5 h.p..	$13.95
B. V-belt Clutch up to 1.5 h.p..	$ 7.49
C. Hand Gas Pump 10 g.p.m.....	$15.90
D. Army Field Telephone EE-8....	$11.25
E. Rural Phones (6 bar).....	$12.40
F. City Desk Phones (Com. Batt.)	$ 4.99
G. Briggs 2.5 h.p. Engine.....	$78.50
H. 2-sta. phone inter com.....	$11.60
I. 110-v. Electric Chain Saw.....	$94.50
J. Auto Compression Tester.....	$ 3.94

EVERYTHING BRAND NEW!

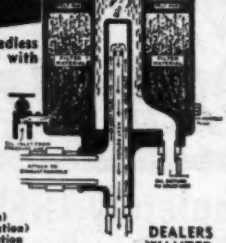
- **Complete satisfaction guaranteed.**
- **Write for free amazing bargain catalog featuring hundreds of electronic, radio, mechanical, tool, pump and other bargains.**

Burden Prepays All Shipping Charges

PRINT CAP PLEASE

BURDEN SALES COMPANY
823 "O" St. LINCOLN, NEBR.

STOP CHANGING MOTOR OIL!



End this needless expense forever with

RECLAIMO Today's Most Advanced OIL RE-REFINING filter FOR CARS, TRUCKS, TRACTORS & DIESELS

Continuously cleans and RE-REFINES motor oil as you drive (by utilizing motor heat)—keeps oil in high grade lubricating quality at all times!

"RECLAIMO"

- REMOVES SOLIDS (by filtration)
- REMOVES WATER (by distillation)
- PREVENTS Excess Fuel Dilution
- PREVENTS Acid and Sludge Formation
- ADDS Thousands of Miles to Engine Life

MAINTAINS Stable Viscosity **ELIMINATES** All Oil Changes

FREE 32-PAGE BOOK "OIL FACTS" (with bona-fide $1000.00 offer on page 30), gives you the complete "Reclaimo" story and details of our extraordinary 90-DAY NO-RISK TRIAL OFFER! Write for your copy TODAY!

DEALERS WANTED

U.S. BUREAU OF STANDARDS, Bul. 86 States, "Oil does not wear out-mechanically."

MONEY-BACK GUARANTEE

Reclaimo Sales Div., Inc.
4508 S. Logan, Dept. S-5, Lansing, Mich.

Plane it SQUARE!

with the SQUAR-EZY guide

fast, accurately.... easily

Attach it to YOUR plane quickly and easily for perfect JOINING and EDGING ● Rugged Construction, Roller Spindle Accurately Machined ● Model 7 guide fits Block & Smooth Planes Nos. 3, 4, $2.98 ● Model 11 guide fits No. 5 Jack (14") and larger $3.49 ● Order Direct and Ask Your Dealer: Literature Available.

Satisfaction Guaranteed

BRATCO

THE BRATTON COMPANY
DEPT. 456 EDWARDSVILLE, KANSAS

7x50
$36
Illustrated

BINOCULARS TELESCOPES

Big Bargain Catalog Free

BROWNSCOPE CO.
Dept. 1P, 24 West 45th St.
New York 19, N. Y.

THE BIGGEST VALUE ON THE MARKET DIRECT FACTORY TO YOU

DYNAMIC SUPER-CHARGED ARC-WELDER

DOES WELDING, BRAZING, SOLDERING, CUTTING

It's the finest, precision built heavy duty transformer-welder available for home, farm, or shop use. Does work you'd expect from costlier machines. EASY TO OPERATE. Do expert work; follow simple instructions. Works on iron, steel, brass, bronze, aluminum and other metals. Operates from any properly wired 110 volt 50/60 cycle AC line. Save time, Make money—Build or repair auto, home, farm or shop equipment, etc. for yourself and others in spare or full time. Comes complete Ready-To-Operate. Order today for 10 day trial on money back guarantee or write for Free Particulars.

DYNAMIC WELDER CO., Dept. D3-AB6, 15 E. 23rd St., Chicago 16, Ill.

$41.80 VALUE ONLY $33.50 F.O.B. COMPLETE

OVER 50,000 SATISFIED USERS

Attachments worth $8.30 included at no extra cost for prompt action. Write for details **FREE**

FIX IT or FASTEN IT
Better and Faster!

NEW TINNERMAN
Speed Nut®

TINKER KIT

SPEED NUT—the one-piece, self-locking, vibration-proof fastener—famous throughout industry...
NOW READY FOR HOME USE!
Handy assortment of 10 popular sizes of SPEED NUTS and matching screws. Over 100 home repair and hobbycraft uses. Once on—they stay on! Replace threaded nuts and lock washers.

ONLY $1.00
POSTAGE INCLUDED
SEND CASH OR CHECK—NO STAMPS

TINNERMAN PRODUCTS, INC.
DEPARTMENT 13-A • CLEVELAND 1, OHIO

GET BETTER PAINT RESULTS

WITH A SINGLE COAT . . . New free illustrated 24-page book tells right kind of aluminum paint to use. We don't make paint, but have prepared this fact-packed book to help you get best results with aluminum paint. Write for free copy of "Paint it Bright".
ALUMINUM COMPANY OF AMERICA,
1717A Gulf Building, Pittsburgh 19, Pa.

DUAL CROSS and ROTARY FEED

PALMGREN ROTARY, INDEX, MILLING TABLE

Has 8" table, 360° movement and 4" cross feed travel. Adjusting wheels and dials graduated in degrees and thousands. Slotted for bolting to table. **No. 83** Priced **$49.50. No. 82** without rotary feed **$39.75.**
Write for Circular No. 10
CHICAGO TOOL and ENGINEERING CO.
8396 South Chicago Ave., Chicago 17, Ill.

***Sharpen* SAWS FOR PROFIT**

RETOOTH HAND SAWS IN 60 SECONDS

Increase your income with automatic retoother that cuts 4 to 16 point rip or cross-cut teeth in hand saws.

Requires less space, less time and less effort . . . while doing a perfect job. Gives a lifetime of service and has a 1 year guarantee. Free folder on request

Automatic Retoother

Motor Driven Saw Filer

EARN $6 AN HOUR WITH THE MOTOR DRIVEN BURR SAW FILER

It does a better, faster and easier filing job. No time killing adjustments necessary . . . the accurate operator-controlled file arm will file from both sides. Gives a lifetime of service and has a 1 year guarantee. FREE FOLDER ON REQUEST.

WRITE FOR VALUABLE BOOK
Send 25c in coin for Burr's Blue Book of saw shop charges and other valuable information.

SAW SHOP CHARGES Coast to Coast

BURR MFG. CO., Dept. 1 8943 Venice Blvd., Los Angeles 34, Calif.

***Atlas* THE HOME SHOP WORKHORSE!**

7 TOOLS IN 1 PLUS—
a host of odd job Time Savers

BENCH and FLOOR DRILL PRESSES

Mixing

Cleaning

Buffing

Polishing

Sanding

You get a score of useful, time-and-money saving operations when you put an Atlas drill press and accessories in your shop.

It drills, taps, routs, mortises, shapes, carves — just a few of its other uses are pictured. The Atlas is precision built, with speed range and ball bearings to handle metal and plastic work as well as wood.

Many new features — send coupon for complete catalog.

ATLAS PRESS CO.
155 N. Pitcher St., Kalamazoo, Mich.

Please send your complete catalog on Atlas Woodworking tools.

Name_____

Address_____

City, State_____

DRAINS Cellars, Wash Trays; CIRCULATES Oil; IRRIGATES Gardens

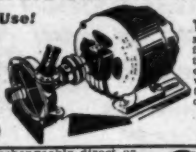
ORIGINAL "Type P" Pump has 1,001 year 'round uses—home, shop, garden, farm. DRAINS cellars, cisterns, wash tubs, ditches, pools. IRRIGATES gardens, lawns. CIRCULATES oil, coolant. SUPPLIES water to elevated tanks from wells as deep as 25 feet. 2400 gals. per hr. capacity. 360 GPH 75' high. 1500 GPH from 25' well. 1" suction and ¾" discharge ports fitted for hose. Quiet, humless operation. Use ⅛ to ¼ HP motor. Easily installed. Complete instructions furnished. DOES NOT CLOG OR RUST!

ONLY $6.95 *postpaid if check or money order with order.*

WHICH OF THESE 4 PUMPING UNITS DO YOU WANT?

Easy to Assemble! Easy to Use!

"LITTLE GUSHER" Pump irrigates, drains, waters live stock, fights fires! Pumps 2,000 GPH 25' high or 360 GPH 75' high. Has ¾ HP engine with 3" power take-off V-pulley. Engine adjustable from 1700 to 4500 RPM. Portable—only 26 pounds. Dollar for dollar, pound for pound, the best pump value at **$59.00**



TYPE C-4 Pump has Direct Drive. Ideal for plumbing fixtures below sewer line. Complete with ¼ HP motor, $20.45. Without motor, only **$10.50**

TYPE D-3 Pump cleans 40' well or cesspool quickly! Operates in any position. Pumps 400 GPH 40' high or 1400 GPH 20' high. Complete with ½ HP motor **$25.45**

Without motor, only **$11.75**

TYPE E Pump has interchangeable direct or belt drive for all 'round use. **E-4** fitted with 5" pulley. Complete, with ¼ HP motor, $22.75. Without motor, only **$12.75**

E-3 fitted with 6" pulley. Complete with ½ HP motor, $24.75. Without motor, only **$13.05**

MONEY BACK GUARANTEE

All Bronze Foot Valve for 1" hose . . . $2.75
1" Suction Hose—per foot 35
¾" Discharge Hose—per foot 20

All prices POSTPAID if check or money order with order. West of Mississippi, add 50c for Type P; $1.00 for other models.

LABAWCO PUMPS • Belle Mead 4, N. J.

METAL REPAIRS MADE EASY WITH

Kester Solder

SEND FOR NEW FREE Soldering Booklet

KESTER SOLDER COMPANY
4254 Wrightwood Ave., Chicago 39, Ill.

AMAZING NEW WOOD-TURNING TOOLS!

Outlasts Steel Up to 50 to 1!

SHARPEN ONCE IN 12-YEARS! (UNDER NORMAL USE)

These remarkable tools tipped with TUNGSTEN CARBIDE will astound you with their performance. They work FREE HAND equally well in wood, plastic or soft metals—and at the same time hold their razor-like edge almost indefinitely. Tests show that they will turn wood or plastic for days and days CONTINUOUSLY without showing any signs of dulling. They are the finest tools available at any price. Beautifully finished 5" blade—flush ground, polished tip—finest brass tube ferrule—9" hardwood handle—over all length 14"—25 tools to choose from: round & square nose from 1/8" to 1/2"—1/2 and 3/16 cut off; 1/2"x30° skew, spear, r. & l. skews, turning and parting. Amazingly Low Prices! Write at once for free literature.

JOHNS MFG. CO., DUNELLEN 1, N. J.

The JIFFY metal CABINET

YOUR ANSWER TO SMALL ITEMS STORAGE at home, office, and shop (IDEAL GIFT, TOO)

So handy to keep nuts, bolts, screws, nails, parts, washers, stamps, hobbyists' needs, etc., at your fingertips.

THIS 32 DRAWER UNIT ONLY $8.95 POSTPAID

Stop searching, get a 32 or 64 drawer Jiffy to keep those small items that usually get mislaid. Spot welded steel, gray enamel finish, metal drawer guides. Dividers included with aluminum drawers make possible three compartments per drawer. Looks good anywhere. Send check or money order, please—no C. O. D.'s. Prices below. Your money refunded if not satisfied. Dealers write for quantity discount.

SPECIFICATIONS
32 Drawer Unit
6" Deep
12¾" Wide
15¼" High
64 Drawer Unit
6" Deep
25½" Wide
15¼" High
Drawer Size
1½" Deep
2¾" Wide
6" Long

WITH ALUMINUM DRAWERS
Dividers and Index Cards Included
One piece rustproof aluminum drawers for heavy service — good for work bench and industry use.
32 drawer - $8.95
64 drawer - $15.95
Ohio orders add 3% sales tax.
Marproof Rubber Feet included with all cabinets
POSTAGE PAID | POSTAGE PAID

NEW SPECIAL!
ONLY $2.95
8 DRAWER UNIT (24 compartments)
16 DRAWER UNIT (48 compartments)
$4.95
Specifications
6" Deep, 8¼" High
8 Drawer 6⅝" Wide
16 Drawer 12⅝" Wide

KAYTEE PRODUCTS, Dept. S. Box 588, Canton, O.

MILLER ROTARY

HI-SPEED ROPE-SAW DRILL-BIT
IT SAWS CUTS REAMS

Presents **The Big 3**

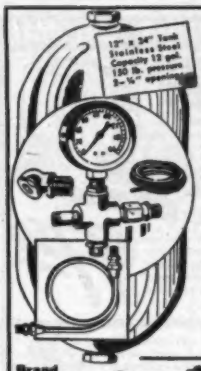
Each Bit Performs its own Function Specify Which

SAWS, CUTS, REAMS Sheet metal, angle iron, pipe, wood, plastic, Transite, etc. Amazing high-speed combination bit and saw fits any ¼" or ½" electric drill or slow drill press. Drills own starting hole to quickly cut, saw or ream opening. Easy to operate. Ideal for carpenters, auto mechanics, electricians, plumbers, hobby workers, many others. Abrasive resistant high speed steel. No breaking. Will withstand severe continuous use. Resharpened at no charge. ¼" diameter, over-all length 3½", cutting section 2" long with flutes ground from solid. Shipped same day—money back guarantee. Discounts on quantity orders from dealers. Takes place of up to $50 in tools. SEND CASH, CHECK OR M.O.

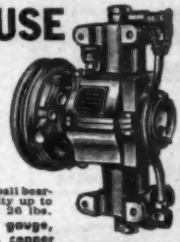
Each $3.95 Post-paid **3 for only $11.50** Post-paid

Manufactured and distributed by:

INTERNATIONAL TWIST DRILL CORP.
624 Wyandotte Rm. 253 Kansas City 6, Mo.
"Pioneers in break-resistant short drills"



WESTINGHOUSE Air Compressor



Reg. $60.50 . . . Only

Model T-1 Brand New — 2 CYLINDER PISTON TYPE **$21.50**

Operates with ½ H.P. Motor or equivalent gas engine.

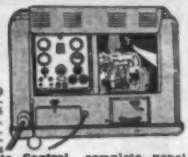
Compressor has 2" bore, 1½" stroke, ball bearing. 3.27 CFM at 600 R.P.M. Capacity up to 0.34 CFM. Size 9"x11½"x6½". Wt. 30 lbs.

Compressor, pressure tank, air gauge, air chuck, 20-ft. hose, pop valve, copper tubing with 4 brass flared fittings for connecting compressor to tank, 4-way cross and 3 nipples.

COMPLETE OUTFIT, wt. 52 lbs. **$32.50**

EQUIPMENT LESS COMPRESSOR, $12.50
COMPRESSOR SEPARATELY, $21.50
TANK ONLY, $6.95

LIGHT PLANTS



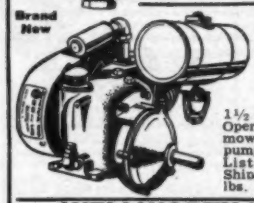
Brand New! War Surplus

Signal Corps Power Unit PE 197

118 volt 60 cycle A.C. single phase 5 K.W. Hobart, water cooled. 14 h.p. 4 cylinder Hercules engine. **Remote Control**, complete panel board with instruments. 150 ft. automatic remote control cable with reel; 150 feet #6 heavy duty wire with reel; housed in metal case with replacement parts and tools. Cable with reels alone worth $400.
Regular price of unit $1900. Shipping wt. 1250 lbs. Our price, complete, f.o.b. Chicago **$895.00**

Same unit, slightly used. Reconditioned. Fully guaranteed ..... **$495.00** less cable

2½ K. W. LELAND POWER PLANT **$295.00**



Brand New

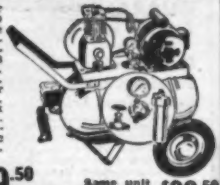
Save 50 % on Gas Engines!

Red Seal Continental

6 to 1 REDUCTION GEAR
1 CYLINDER — 4 CYCLE

1½ HP with 6 to 1 reduction gear. Operates at 450 R.P.M. For lawn mowers, scooters, garden tractors, pumps, compressors, generators, etc. List Price $79.50. Shipping weight 54 lbs. SPECIAL PRICE **$39.50**

AUTOMATIC COMPRESSOR UNIT



½ H.P. heavy duty capacitor motor, AC 110/220 volt, 60 cycle, 2x1¾ inch piston type compressor, splash feed lubrication. 12x24 inch tank, automatic pressure switch, CFM 2.8 at 100 lb. pressure, or 150 lbs. pressure for intermittent duty. Check valve, safety valve, air regulator with gauge and filter. 20 ft. air hose with air chuck for inflating tires, V. belt drive. Mounted on 3 wheels, ball bearing, with 2"x10" pneumatic tires. Portable with handle. Shipping wt. 90 lbs.

SPECIAL PRICE..... **$89.50**

Same unit with Gas Engine **$99.50**

WELLWORTH V-BELT CLUTCH

Takes starting load off engines or motors. When speed is reached, a flip of handle shifts clutch from idling to driving position. Handles "A" belts, 2.35" pitch diameter. 5/8" bore. Ideal for use with lawn mowers, garden tractors, home workshop motors, etc. 3¼" long. Safe, easy to mount, sealed bronze bearings. positive action. Shpg. wt. 3 lbs. Bushing for ½" shaft, 15c **$7.50**

SAME CLUTCH FURNISHED WITH ¾" bore $8.50

AUTOMATIC PRESSURE SWITCH FOR AIR OR WATER

20 to 40 lbs. **$5.95**
75 to 100 lbs. **$8.95**
125 to 150 lbs. with unloader **$11.95**
¼" check valve **$2.75**
½" check valve **$4.50**

AIR REGULATOR AND EXTRACTOR

¼" Air Regulator, Gauge and filter. Wt. 5 lbs. **$8.95**

Regulator and Gauge only **$5.95**

Air Filter only **$3.25**

PORTABLE ELECTRIC HAND SAW

The Zip Saws With ALL the Features

6¼" Diameter saw blade, ½" square arbor hole. Maximum depth of cut 2⅛". (At 45°, 1¾".) Minimum depth of cut 0". Angular adjustment 90° to 45°. No-load speed, 5200 r.p.m. Full load speed, 3200 r.p.m. Amperes, full load, 8.0. Universal AC-DC motor, 110/220 volt. Dimensions: 11¼" long; 9⅛" wide (ripping guide removed); 7⅛" high (without blade). Furnished complete with 6¼" diameter combination blade and 10 ft. cord and plug. Wt. 11½ lbs. Price..... **$39.95**

"WELLWORTH" BLOWER BARGAIN

Quiet operating. Double wheel inlet, double width blower. For heating, ventilating, cooling, air washing, exhausting and forced draft. DIMENSIONS: 10" wheel; outlet 13⅛"x11⅜"; inlet 8¾". Height 19". Width 18". Depth 16½". C.F.M., ⅛" S.P. 1600; outlet vel. 1375; motor ½ H.P. with overload relay; cord & plug 110 v. 60 cy. A.C. Ship. wt. 67 lbs. Special price.. **$42.75**

Blower less motor and drive.. **$27.50**

CHICAGO PNEUMATIC RIVETER & CHIPPING HAMMER

CP4X Pistol grip handle. Takes up to 5/16" rivet. Weight 5 lbs. List price $72.00. **BRAND NEW** **$32.50**
Used, like new, guaranteed **$17.50**

Chicago Pneumatic Lever Type AIR DRILL

With ¼" Jacob Chuck. Wt. 2 lbs. List price $55.00. Only..... **$17.95**

6 FT. STOW FLEXIBLE SHAFT

¾" Core. Ball bearing handle and arbor. Operates on ¼ H.P. Motor at 1725 or 3450 r.p.m. $29.00 value. Wt. 8 lbs. **$14.50**

Prices f. o. b. Chicago. Money back guaranteed. Send check or money order today. Prompt shipment.

NEW CATALOG

Motor guide, air compressors, home and factory workshop tools, light plants, luggage bargains. Send 10c for postage.

WELLWORTH TRADING CO.

1831 S. STATE ST. DEPT. B-1 CHICAGO 16, ILL.

POWER MOWERS & KITS

FREE PLANS

LOW FACTORY PRICES DIRECT TO YOU

America's Finest Power Mowers completely assembled in 3 and 4 wheel models. Belt or direct drive. 18" and 20" sizes. Nationally known make engine optional. Latest improved features, sturdy construction and money back guarantee fully described in color folder. Write Today.

Build your own quality mower with our LOW COST KITS. Parts, Engines. Free Plans guide you, 3 and 4 Wheel Kits, complete. Parts precision finished, ready to use. Write TODAY for Free Plans, Low Prices, Parts List and Guarantee.

3-WHEEL KIT NO. T-800

TRIANGLE MANUFACTURING CO., Box S-2, Fort Scott, Kansas

WELD

BRAZE, SOLDER, and CUT →

ONLY $11.95 F.O.B. complete!

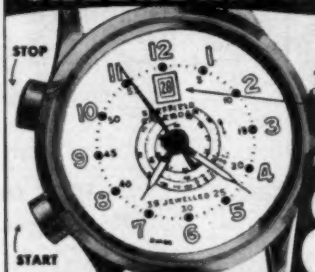
EASILY... QUICKLY!

No experience needed. Follow simple instructions, weld on iron, steel, bronze, brass, aluminum, and other metals. Plugs into any properly wired 110 volt A.C. or D.C. line. Make or save time and money doing repair work for yourself and others. Repair men, farmers, tinsmiths, home and auto owners, hobbyists, etc., say FOUR-WAY pays for itself over and over. Order today or send for Free details.

FOUR-WAY WELDER COMPANY, Dept. F3-AB
2326 So. Michigan Ave. • Chicago 16, Illinois

LIFETIME CHRONOGRAPH, STOP-WATCH

CALENDAR WATCH



It's also a TELEMETER & TACHOMETER

NEW LOW PRICE **8.95** with Steel Expansion Band Plus 10% Tax (90¢)

FULLY GUARANTEED for One Year

Plus Lifetime Service Certificate 5-Day Free Trial.

31-Day Calendar

Changes dates automatically! For Sportsmen, Scouts, Photographers, Engineers, Chemists, Navigators, Doctors.

Remarkable Import Buy—these ideal all-around timepieces and chronographs at an unbelievable low, low price. Imported Swiss jeweled movement, Radium Glow 1" dial, red sweep-second hand, shock-resistant case, unbreakable crystal. And—included is the handsome, rich-looking steel expansion wristband. Complete instructions included together with guarantee and service certificate. White, Pink or Black dial face, specify color.

GAYLOND Dept. SN-7, Fifth & Hamilton, Pittsburgh 6, Pa.

I enclose ☐ Check ☐ Money Order ☐ Send C.O.D.

Send _____ Chronograph watches at 8.95 (Postpaid), plus 10% tax on 5-day free trial. **Money Back Guarantee.** Name & Address on Margin.

Sharpens 1,000 MOWERS per Season

in spare time with the

FOLEY LAWN MOWER SHARPENER

"I save sharpened over 10,000 mowers in my Foley Lawn Mower Sharpener in the last 10 years—only repairs needed were new belts."—Charles H. Smith. From Ralph Rand—"The first month's business paid for my machine." The Foley sharpens all sizes and types of mowers in 15 or 20 minutes (with handles on). Prices run from $1.50 to $2.00 for hand mowers, and $5.00 to $8.00 for power mowers. This is the way to make money!—99c out of each dollar you take in is profit!

FREE BOOK—"How to Sharpen Power Mowers" with the Foley Lawn Mower Sharpener.

Prices $97.50 to $159.50

—easy payment terms available. FREE PLAN shows how to start. Mail coupon today—no salesman will call.

Send for FREE PLAN

FOLEY MFG. CO., 103-1 Foley Bldg., Minneapolis 13, Minn.

Send FREE PLAN and FREE BOOK on the Foley Lawn Mower Sharpening business.

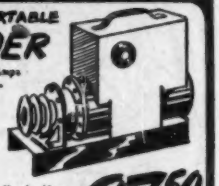
Name .....

Address .....

WAR SURPLUS SPECIAL

NEW! STATIONARY or PORTABLE

D.C. ARC WELDER



300 Amps Continuous. 350 – 400 Amps Intermittent. For ALL WELDING – LIGHT or HEAVY!!

This rugged air-cooled precision built electric ARC WELDER – designed to weld for hours comes complete with pulley reactor, output controls, Hi–Lo switches, rheostats. The heart of this unit is the famous R–1 generator, specially developed for B–29 Bombers, and with features no other generator has. Heavy steel frame, easily adapted to mounting on Jeep, Tractor or other power supply (10 H.P. gas or electric). Never before offered at this low price.

97.50

Ellinwood "44" Here's a Real BUY!! This engine is rated from 4.4 to 5 HP. Has optional power take-off of 1 to 1 from crankshaft or 2 to 1 reduction from camshaft. Makes an ideal auxiliary power plant or can be used to drive pumps, generators, compressors, small boats, etc. Lightweight rugged and contains such fine component parts as Bendix–Timken–Air Maze, etc. ..... ONLY **57.95**

CONTINENTAL The famous 4 cycle, air-cooled "L" head gas engine, 1½ to 2 HP. Cheap power for Farm, Factory, Shop. **37.50** NEW READY TO RUN

CLARK DRILL . . . Fully reconditioned and in tip-top shape. Made to rigid Government specifications and will take most rigid abuse. 110 volt A.C. Cycle, 1 phase, Ball Bearing motors in 5,000 R.P.M. **¼" HEAVY DUTY** 1/4" Jacobs Chuck . . . 8 ft. cord and plug ..... A $55 VALUE **17.95**

RIVET GUNS Pistol & Gooseneck Type $8.95

Hundreds more Bargains in our latest 1950 TOOL CATALOG 72 PAGES Showing our tremendous selection of Air and Machine Tools, Hydraulics Motors, Pumps, Valves, Fittings, etc. Send 25¢ to cover handlg & postage.

LINEMAN'S KIT– Type used by U.S. Army Signal Corps. Consists of pair of heavy duty lineman's pliers with pipe jaws & side cutters – a fine quality 2 bladed wire-skinning knife. In reg. Signal Corps leather pouch. **2.39**

3/4" HEAVY DUTY – 2 SPEED Portable DRILL

Never before such a value. Converted from aircraft starter-energizer. Ideal for all types heavy drilling. Has 2 speed control for 200 RPM low, or 275 RPM high. Heavy duty gear box gives extremely high torque. ¾" Stndrd. Jacobs Chuck. Universal ball bearing motor – 110 – 115 volt AC or DC. Length 32 inches.

Only **62.50** Equipped with 50ft. Electric cable

CHEMISTRY SET Made for Chemical Warfare Division for testing water, etc. A handy addition to the chemistry lab. or an exciting experiment for the amateur. Set includes test tubes, complete instructions, 15 different items. Packed in attractive lucite box with cover & dividers. Set **$1.39**

Plexiglass & Nascolite clear plastic shts.

NASCOLITE – Full sheets app. 1/8" x 37½" x 49½", app. 10½ lbs. each $12.50

PLEXIGLASS – Full Sheet
5/16" x 36" x 24" ... Per Sheet.. $13.00
5/16" x 36" x 48" ... Per Sheet.. $25.00

Fabricators write to for our special quantity prices, all above are new & mashed. Also inquire about other large stocks of Plastics.

NEW TARPS - HEAVY CANVAS

Mildew & Flame Resistant. Cheap outside storage! They are really moving at these prices.

9" x 16" $11.95
5" x 7" 3.95
16" x 16" 25.60

Rubberized Nylon Tarp 7" x 11" **6.95**

New Rubberized Linen Tarp – 7' x 11' Waterproof, weighs only 3 lbs. Ideal for outside car storage . **5.95**

18 OZ. TARP – 6' x 6' – O.D. Duck. Can be used as a tent floor covering or storage protector. A terrific buy! Used – but in excellent condition **3.95**

NEW ELECTRIC MOTORS

No. 500 – New ½ HP – 27 Volt DC-AC. This motor can be readily adapted to deliver up to ½ HP on 110 Volts AC by the simple method of rearranging armature brush-leads. Free diagram with each order. A sensational Value $5.95

No. 500-A – Converted to 110 Volts-AC Equipped with plug and 30½ ft. Heavy Duty Cord $8.49

CLAMP-ON ANYWHERE LAMP Has adjustable ball and socket swivel head, long rubber covered cord & wall plug.

The All-Purpose lamp. Wonderful for indoor photography, Floodlights, Baby Spot or Large Spot, Personal Bed Reading, Work Bench, Garage, etc. Lamp alone **1.09**

Highly polished 9" diameter Parabolic Reflector ..... **95¢ ea.**
or 5" diameter Spot Reflector

PALLEY SUPPLY CO

Dept. PS-1 GLENDALE 1, CALIF.

SEE OPPOSITE PAGE FOR TERMS

SAVE UP TO 85% IN WAR SURPLUS from "GADGETEERS" HEAVEN

SHEEPSKIN LINED LEATHER JACKET

These Navy Arctic jackets are fully lined with the finest quality sheepskin obtainable. Comes with storm tabs and fur collar. Two deep patch pockets, adjustable waist and heavy duty zipper. Sizes 36 thru 44 in excellent cond. Cost Gov't approx. $80. ONLY **27.50**

NAVY WADING SUIT

Here's a suit that will make surf fishing a pleasure. Made of rubberized canvas, with vulcanized seams. It will keep you absolutely dry. Has built in rubber gloves and ½ length rubber boots. Air tight Buoyancy pockets inside keep you balanced in deep water. Has 100% waterproof liner & Guaranteed condition.. **6.95**

AAF CASE

Genuine top grade leather. Multi-compartment. Lock and Straps. Ideal for Artists, Students, Salesmen, etc. Used, good condition. . . **7.95**

AIR CORPS BRIEF CASE

This is a genuine piece of AAF equipment. Made of best grade Brown Leather in a handsome Pebble finish with a light canvas liner. Has two full length map or paper compartments and three smaller pockets. An ideal case for students, salesmen, artists, etc. Full heavy duty zipper closure. 12" x 16". Shpg.Wt. 3 lbs. ONLY **2.95**

Loose Leaf BINDER

3 metal post. Cylindrical locking heavy duty 3/16" fabricated hinged cover. End identification window. Ideal for price books, salesman catalogues, photo albums, students, publications, Reference books. etc. Will hold 500 sheets, 8" x 11". **69c** ea.

PLEXI DOME

Overall length 21" - Width at widest point 11" - at base 4". 6" deep. For Fish & Flower Bowls - Cab Roof - Lights. **1.89**

GOOSENECK LAMP

Consists of 24 volt control box with dimmer switch, 18" flexible extension & frosted glass shade. Can be used on 110 volt current. **2.49**

NAVIGATORS LAMP

A handy light for desk, work bench, chart table, engine room, etc. Can be used on 6-12-24-110 V by changing bulb. 3 ft. shaft has 4 joints to adjust position... ONLY. **2.95**

Sealed Beam LAMP

U.S. Navy Portable Pistol Grip light. Has sealed beam and aiming sight. Ideal for search, spot or Emergency light on auto, boat, farm etc. . . . .

12 Volt light, 4" lens **2.95**
24 Volt, 5" lens & carry case . . **3.49**
Set of 3 filters, Red, Grn, Amber . (specify type lamp) . . . . . **99¢**

16mm MOVIE CAMERA

Has semi-telephoto 1-3/8" (35mm) lens with yellow filter – 3 shutter speeds: for normal (16 frames), semi-slow motion (32 frames), and for slow motion (64 frames) per second. Uses any standard Eastman film magazine or Type "G" AAF magazine. Takes Black & White or Full Color pictures. Operates on 24V. (dry cell batteries) & requires slight conversion for hand use. Diagram furnished. Cost Gov't $235.00. **24.50**

CONVERTED GUN CAMERA – Fully reconditioned with start switch on front. Gray Crackle Finish **33.95**

NEW WATCH

Here's a real Shock Absorbing watch. Has jewel movement, Sweep second hand, luminous dial, chrome case. Guaranteed for one year. Ideal for young and old. . . . . **6.95** Plus 10% Fed. Tax.

ELGIN 7 Jewel TIMER . . Plus 10% Fed. Tax.
Pocket type. 60 second dial divided into 5th's of second. Also 30 minute recorder dial, shatterproof crystal. This genuine Bureau of Ordnance watch has $35.00 value. Shipped in steel, shock-absorbing suspension case. **15.95** Plus 10% Fed. Tax.

17 JEWEL Chronograph. One of the finest made anywhere. Cased in Switzerland. Sweep second hand, stop and re-set buttons. Measures distance, airspeed, ground-speed, races. Ideal for the sportsman. . . **23.95** Plus Tax

17 JEWEL AUTOMATIC WRISTWATCH . . . Swiss made man's wrist watch. A real self-winding watch . . . winds itself while you wear it. Incablec (shock protected). Swiss movement. Sweep second hand, luminous dial and hands. Silver white or black face. Waterproof nickel chrome case. Stainless steel back. Hours marked in numerals. Genuine leather strap. Red second hand with arrow tip . . . . . GUARANTEED **Only 23.95** Plus 10% Fed. Tax

Genuine ARMY AIR FORCES SUNGLASSES

HERE'S THE REAL McCOY!

ARMY AIR FORCE - 6 base. Precision Polished & Ground Glare-Free caliber lenses. Leather case to be attached to belt. Gold plated adjustable frame. Pearloid sweat bar and pads. $17.50 Pelley value for ONLY **$3.95**

With 57mm yellow, amber, 6 base lenses. Optically precision ground and polished! Your doctor will recommend these. Not a cheap "Process" lens. Reduces headlight glare and sharpens 'object focus' during night driving.
Men's size or Ladies Harlequin style. NO-1, $16.00 VALUE **14.29**
SAME GLASSES but clip-on's. Fit-over style without temple bars. **3.95**

Aviators (AN-6530) Windproof & Dustproof GENUINE GOGGLES

Rubber or chamois covered frame. Clear or Green GROUND LENSES are inter-changeable. Adjustable nose bar. Ideal for flying, motor cycling, etc. **$1.69**

GO-1 GOGGLE KIT
NEW! U.S. Navy –
Has soft sponge rubber frame. 4 Polaroid lenses 2 green, 1 red, 1 clear. Perfect for racing, cycling, etc. **89¢**

MESS TRAY – 6 compartment Stainless Steel – Rustproof – Ideal for Home, Camp, etc. Used but excellent condition . . **79¢**

ARMY PUP TENTS 2 Man . . . Used . . . Perfect . . **5.95**

HUNTING KNIFE . 6" Polished blade, leather sheath **1.69**

BOLO KNIFE 10" Parkerized blade, with case **1.19**

PLASTIC PARALLEL STRAIGHT EDGE

with knobs and rubber pads for non-slippage on each section. A must for navigators, mechanics, draftsmen and engineers.

You've never seen 'em at . . . . **97½ ea.**

AAF FLEECE LINED JACKET

Will keep you warm & comfortable in the roughest weather. Fur lined throughout sleeves & body. 2 slash pockets & hvy duty zipper. Ideal for Farmers Ranchers, Hunters and Mechanics.

RE-CONDITIONED and in WONDERFUL CONDITION! **9.95**

MICROPHONE

Telephone type– Highly Sensitive with excellent, clear tone. This was the Signal Corps favorite. An ideal instrument for the radio 'ham' and professional recording studio, broadcasting, home recording, public address, etc. A Sensational Buy! Complete with cord and plug. . . . ONLY **2.29**

RADIO HEADSET

Low Impedence. Ideal for amateur radio, crystal sets, or professional use. Adjustable ear phones. Used and in excellent condition. . . **1.69**

FLYING SUIT or Blue Bunny SUIT

For hunting, winter sports, skiing or "bundling". As coveralls for cold outdoor, or farm work, 100% woven wool with extra flannel inner lining for double warmth & utility. Wiring so fine, flexible it does not interfere with movement. Can be used with or without heating or can be plugged into car, tractor, or truck battery. Sizes 36 thru 44. **$3.49**

COMPASSES –
Match Box . . . . . **39¢**
Jeweled Watch–Pocket **1.29**
Wrist Strap Type . . . . . **69¢**

15" MONKEY WRENCH
Adjustable Jaw – Opens to 4"
Drop Forged. . Auto Type.
Cadmium Plated **89c** Black **75c**

NEW 1951 CATALOG

PACKED WITH BARGAINS!!!
Just Off The Presses! Big New Thick Book! 200 Pages of NEW and SURPLUS Clothing, Tools, Camp Equipment, Electrical Supplies, Hydraulics, Motors, Pumps, Valves, Raw Stock, etc.

AT UNHEARD OF LOW PRICES!
Send 50c Today! (refunded with your initial order of $1 or more).

EISENHOWER JACKET

Trim, smart military cut jacket – for sports and outdoor wear. Warm and comfortable. Has two patch pockets – two inside pockets – adjustable side straps. Waist belt with buttons and snaps. . . . . ONLY **5.95** each

FLYING HELMET

Fine grade leather – Chamois lined with chin cup on strap. Intermediate weight – Ideal for summer wear. NEW ONLY . . **1.59**

All Novel Winter type with fleece or chamois lining. Has ear puffs & chin cup. Ideal for pilots, cycle – drivers, sportsmen, etc. **1.95**

RUBBER BOOTS

A Sturdy Boot of finest rubber. Completely Waterproof with adjustable strap. Warm with or without shoes. **3.95**

FELT INNER-SOLE & SHOE PAD INSERT – for Cold Weather (Sold only with boots.) Set complete. . **1.50**

NEW NAVIGATOR'S MAGNETIC COMPASS

D-12 Type – Rotating verge range ring, calibrated in 1 degree increments from 9 to 360°. Two parallel grid wires for N-S line alignment
Fine for boats, etc. **14.95**

PRESSURE TANKS

Stainless Steel, Shatterproof & Rustless. Ideal for painting, cooking, spraying, ocean buoys, underwater fishing, or diving.

G-1–12½x24 inches. 2100 Cu. In. capacity **4.75**
F-1–10x18 inches. 1000 Cu. In. capacity **4.19**
F-2–6x45 inches. 1000 Cu. In. capacity **3.95**
D-2–6½x24 inches. 500 Cu. In. capacity. Stainless Steel Construction **3.49**
D-2A–Corrosion resistant steel . Same as D-2 . . . . **2.49**
A-6–5½x15 inches. 280 Cu. In. capacity **2.25**
A-4–5x8 inches. 104 Cu. In. capacity **1.35**

NOTE: All tanks are guaranteed serviceable and free from leaks or dents.

TANK

Dural with welded seams, 2" filler with cap, two standard pipe parts for hookup. Visible liquid level gauge on side. Ideal for Gas, Oil, Water, or "spare" on auto, tractor, truck or boat. Sturdy, light. Capacity 6 gals. **14.95**

NEW TANK

For Gas, Oil, Water, etc. Seamless, welded tank, made of aluminum with filter Screen and Pack. Has stick level gauge. 19 gal. capacity **6.95**

Order from this Ad. All sales final. All Prices F. O. B. Glendale. Pay by M.O or Check. P.O.'s Accptd. from D. & B. items. ½ deposit with C.O.D's.

PALLEY SUPPLY CO

Dept. PS-1 GLENDALE, CALIF.

LARGEST FIRM OF ITS TYPE IN THE WORLD

The Original Low Cost 8" Tilt/Arbor Saw!

STILL TODAY'S BEST BUY!

Many have copied it — but no one has successfully included *all* the performance features of this Atlas-Power King at anywhere near the price! Here is just about everything you could want for all your home and furniture construction projects. A saw that speeds your work, keeps it accurate — a saw built to give you a lifetime of good service at low cost. See it at your Atlas-Power King dealers.

Atlas MOULDING and DADO HEAD

Fits any saw with 1/2" or 5/8" arbor — cuts dadoes, handles all straight shaping jobs.

Some of the Outstanding Features

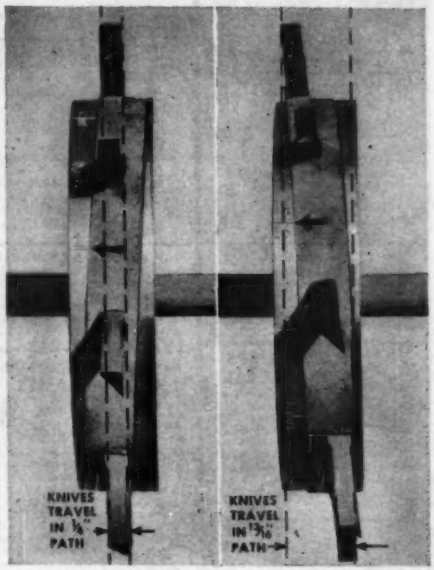
- ★ Tilt/Arbor, Ball Bearing Construction!
- ★ 2 5/16" Depth of Cut — Greatest In Its Class!
- ★ 11 1/2" Table Surface Ahead of Blade When Cutting 1" Stock!
- ★ Big Precision-Ground 16" x 20" Grey Iron Table! 34" x 20" With Two Low-Cost Extensions.
- ★ Quick Positioning Rip Fence — Locks At Both Ends.

FREE Catalog and Shop Hints
Send a Post Card

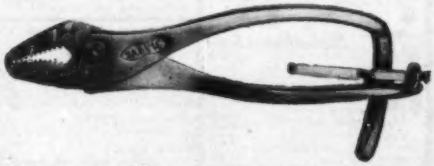
ATLAS PRESS CO.
142 N. Pitcher St., Kalamazoo, Mich.

MATCHED PRECISION TOOLS FOR METALWORKING AND WOODWORKING

New

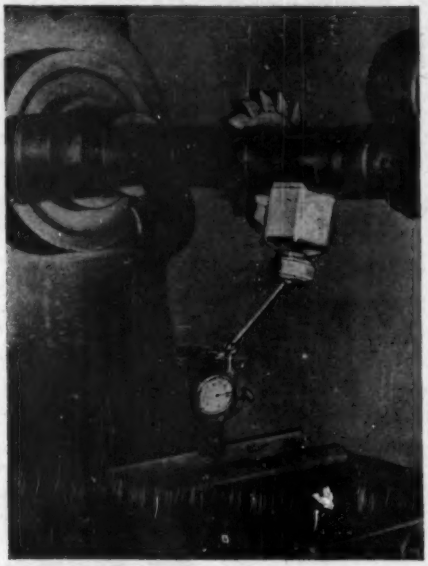


Adjustable Tool Cuts Dadoes. Without removing this tool from the saw arbor, it can be adjusted to cut dadoes from 1/4" to 13/16" wide and up to 3/4" deep. It's built of interlocking aluminum side plates and a center disk of steel. The plates are machined flat on the outside and at an angle on the inside. By loosening the nut on the arbor and rotating the center between the sides, the width of cut can be varied. Consolidated Machinery & Supply Co., Ltd., Los Angeles, prices the tool at $19.75.



Slip-Joint Pliers Self Locking. These pliers can also be used as a wrench or clamp because of a self-locking feature. The jaws open to 7/8" for locking action and to 1 1/4" for pliers action. Sarvie Tool Co., Alexander, Minn., prices the tool at $1.85.

Tools



Magnet Holds Test Indicator. This holder, made by Enco Manufacturing Co., of Chicago, can be mounted on any ferrous-metal surface to simplify test setups. The Alnico magnet in the base exerts about a 50-lb. pull and will stick to a round or flat surface. Instead of an indicator, a light can be mounted in the holder.

Hammer Is All Head. The hammer pictured above is designed for direct, lengthwise tapping, rather than the swinging blow delivered by an ordinary hammer. You hold it by the knurled center section and deliver a blow with either end of the 12-ounce hammer. The plastic tappers will not break or chip, according to the manufacturer, Ready Tool Company, of Bridgeport, Conn. The price is $1.50.

Buy THE BEST Starrett STEEL TAPES

Standard of Precision

Quick-reading, error-proof tapes made to Starrett standards of accuracy from the finest tape steel. Types, lengths and styles of graduation to suit every need. In both English and Metric. See them at your Starrett Tool Distributors.

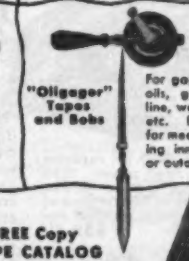
No. 530
3/8" tape line with ring, patented hook and folding wind-up handle. 25, 50, 75 and 100 foot lengths. Handsome, extra-durable red artificial leather cover over plated steel case. Popular price.

No. 510
A quality tape with genuine leather covered steel case.

No. 500 Pocket Tapes
3, 5, 6, 8 and 10 foot lengths, nickel plated case, push-button spring wind.

No. 537 Frame Tapes
Ideal for field work. Steel frame, hardwood grip, flush folding wind-up handle.

"Oligager" Tapes and Bobs
For gaging oils, gasoline, water, etc. Bobs for measuring innage or outage.



Get Your FREE Copy STARRETT TAPE CATALOG
Describes, illustrates and prices the complete line of Starrett Steel Tapes, Plumb Bobs, Levels, Transits and Draftsman's Tools. Address Department F5

THE L. S. STARRETT CO. • ATHOL, MASS., U. S. A.

TRADE MARK
Starrett
REG. U.S. PAT. OFF.
Since 1880 . . . Standard of Precision
Mechanics' Hand Measuring Tools and Precision Instruments
Dial Indicators • Steel Tapes • Hacksaws • Band Saws and Band Knives • Precision Ground Flat Stock
Buy Through Your Distributor

BUILD YOUR OWN TILTING ARBOR SAW!

SAVE $50 OR MORE

Exclusive GIL-BILT Build-It-Yourself Features

- No machining—build easily with hand tools only
- No blueprint reading—step-by-step pictorial plans, full scale patterns, actual photographs
- Sturdy wood, aluminum, and steel construction
- Capacity and performance of commercial saws selling for $60 and up

GIL-BILT 10-INCH TILTING ARBOR SAW

- 27x28 in. table, 13½ in. capacity in front of blade
- 10 in. blade cuts 3¼ in. deep, tilts full 45 degrees
- Floor model 34" high table always stays level
- New Departure ball bearing arbor, ⅝" precision shaft turned down for ⅝" bore blades, alum. housing, shipped ready to run
- Jackscrew and 4½ in. dia. handwheel lowers and raises blade
- Cast aluminum miter gauge and self-aligning rip fence guide

GIL-BILT Metal Parts Kit includes Plans, ball bearing arbor, miter gauge and bar, rip fence guide, dado insert, lock knobs, jackscrew mechanism and handwheel, and all other metal parts (less blade) $20.95
Same Kit with 10" Combination Blade . $24.90
Same Kit with 8" Combination Blade . . $23.90

GIL-BILT 12-INCH BAND SAW

- Cuts to center of 24 inch circle
- Handles stock up to 6 inch thick
- 18x18 inch table tilts 45 degrees
- Lower wheel and drive pulley runs on sealed New Departure Ball Bearings; Upper wheel runs on two ⅝" bore Oilite Bronze bearings
- Upper wheel tension and tilt mechanism of cast aluminum, completely assembled
  - Upper and lower blade guides. Each has ball thrust bearing, self-lub bronze jaws.
  - Rubber tired wheels. Choice of cast aluminum or make-your-own wood wheels on metal hubs
- Uses standard 78 inch blades up to ⅝ inch wide
- Fully enclosed mechanism for utmost safety

GIL-BILT Metal Parts Kit includes Plans, rubber tires, ¼ inch blade, hubs for wood wheels, ball bearing spindle, tilt mechanism, guides, table tilt segments and all other metal parts $16.95
Same Kit with two machined ready-to-install 12" cast aluminum wheels $20.95

Return Kits in 10 days for refund if not satisfied.
(Prices include postage within 600 miles. Over 600 add 5%)

Also available—Plans and Parts Kit for 8" Tilt/Table saw. Order Plans at $1.00 each—sent postpaid anywhere in the world or write for FREE descriptive catalog.

GILLIOM POWER TOOLS P. O. Box 1-VA, Lambert Field St. Louis 21, Missouri

Speed Way

Speed Drills

Advanced designs, new all-die-cast (aluminum) construction and bigger motors. Lighter, handier, yet faster-drilling than more expensive, more cumbersome old style drills. Drill steel, wood, concrete or stone rapidly and efficiently.

See these new Speed-Drills before you buy; for more drill per dollar and more power per lb.

No. 400 ¼" capacity—more power than drills costing almost double. Jacobs Geared Chuck, removable top handle. **$39.50**

No. 79 ¼" capacity—power of ordinary ⅛" drill. **$22.50** With Jacobs Geared Chuck **$27.50**

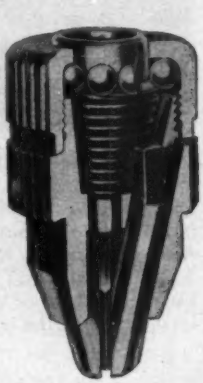
No. 200 ¼" capacity. Fast-drilling with added power. **$16.50**
With Jacobs Geared Chuck. **$19.50**

Write for Circular on drills, grinders and sander

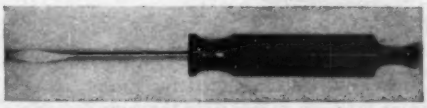
Speed Way MANUFACTURING CO.
1864 So. 52nd Ave. Cicero 50, Illinois

New Tools

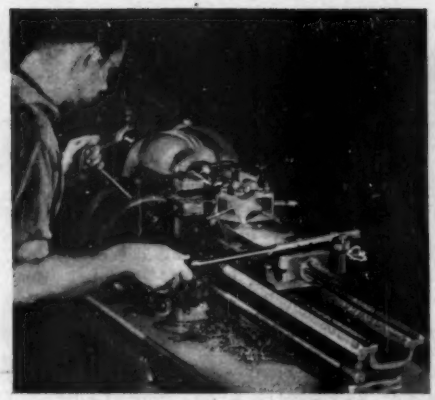
Gears for Band-saws. With this speed-reduction unit, a wood-cutting band-saw can be used to cut metals. The unit comes mounted on an 8" pulley that replaces the pulley on the band-saw. Speed reduction is 16 to 1. Pulling or pushing the gear-shift plunger on the 8" pulley changes the saw for metal or wood cutting. The unit, manufactured by The Erwood Company, of Crystal Lake, Ill., fits a ¾" shaft and is supplied with ½" and ¾" bushings. It has oil-less bronze bearings and ground steel shafts. Price is about $30.



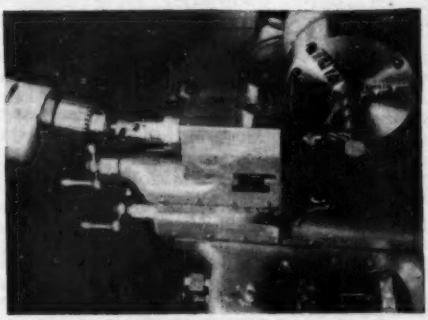
Keyless Chuck. Tools such as drills, reamers, counterbores, or end mills can be inserted and hand-tightened in this chuck. Machining action centers the tool and tightens the grip. The chuck—made by Ettco Tool Co., Inc., of Brooklyn, N. Y.—can be used on a drill press, electric drill, lathe, or milling machine. It's available in four sizes with capacities from 0 to ¾". Prices run from $6.50 to $12.50.



Screwdriver Has Two Speeds. The larger diameter of the handle gives you leverage to set or loosen screws. The knob on the end lets you twirl the screw in or out rapidly. The maker, John R. Perkins, of Wayne, Me., says the tool is 30 to 50 percent faster than an ordinary screwdriver. Phillips, ¾", and 3/16" points are available.



Bed Turret for South Bend Lathes. This bed turret turns a lathe into a production machine but does not change the basic lathe. South Bend Lathe Works, of South Bend, Ind., makes the turret for their 9", 10", and 13" lathes. The turret mounts on the inside bed ways and can be locked in any position on the bed. The base is designed to clear the saddle wings so the turret head can be brought close to the spindle nose. The head may be bored to take six ¾"- or ⅝"-shank standard turret tools. Effective feed of the turret slide is 4".



Lathe Accessory Powered by Drill. This milling converter mounts on the compound rest of a lathe. An electric drill supplies power that is transmitted to the shaft through a universal joint. In the photo above, the converter is doing a spiral milling job. Other work that can be done with the tool includes slotting, end milling, angle drilling, radial drilling, keywaying, and pattern working. The tool can be adapted for grinding jobs. It is sold for about $15 by Martin Laboratories, of Los Angeles.

PANEL YOUR WALLS WITH

PLANKWELD®

It's quick, easy, economical to "do it yourself" with this

PRE-FINISHED WELDWOOD® PLYWOOD

You can save time, money and trouble when you use PLANKWELD for that wood-paneled room you've always wanted.

For Plankweld comes in easy-to-handle ¼" x 16¼" x 8' panels that are *factory*-finished.

Plankweld fits perfectly over 16" studs on new work. And the concealed metal clips that secure the panels to the wall eliminate practically all face-nailing.

Not only that! Because of this convenient clip-fastening, you can put Plankweld up right over old plaster . . . without bothering to install furring strips.

Your lumber dealer has Plankweld in Oak and Birch . . . or if he doesn't, he can get it for you. Ask him about it today, and start planning that wood-paneled room you want.

MAIL THE COUPON FOR FULL INFORMATION ON

PLANKWELD
Weldwood Plywood

UNITED STATES PLYWOOD CORPORATION
(Dept. P.S.-1-51) Box 61, New York 46, N. Y.

Gentlemen:

☐ Please send me FREE folder describing in detail the easy installation of Plankweld.

☐ Enclosed is 10c. I'd like your booklet "Beautiful Wood for Beautiful Homes," too.

Name _____

Street _____

City _____ Zone ____ State ____

P.S. Last minute news & notes...

A MICROSCOPE so powerful that atoms now can be seen--for the first time --has been perfected by Dr. M. J. Buerger, a mineralogist at Massachusetts Institute of Technology. By first using X rays, then using visible light, he has achieved magnifications approaching a million diameters and photographed individual atoms in crystals.

PROPELLERS for 1,000-m.p.h. airplanes are being tested now. They have been designed by the Curtiss-Wright Corp., for turboprop engines of 20,000 hp. . . . SMOKELESS POWDER has been put into JATO booster rockets used by the armed services to help planes take off from short runways and carrier decks without smoking up the place.

BADLY BURNED persons often die from shock but can be saved, the Public Health Service says, by giving them salt and soda in water to drink as soon as possible. Dissolve exactly one level teaspoon of table salt and one-half teaspoon of baking soda in a quart of cool water. A burned person should drink as much as he can without vomiting, not be given anything else until doctor comes.

AN ATOMIC BOILER for students to use and visitors to see is to be built at North Carolina State College in Raleigh. The Atomic Energy Commission will supply the fuel, but will neither own nor operate this reactor. Like one at Los Alamos, it will be run with Uranium 235 in a solution inside a stainless-steel cylinder surrounded by concrete.

WOUNDS and infections that now call for surgery may some day be treated with trypsin, an enzyme that helps digest food. Experimental work at Ohio State University indicates it can be used to dissolve dead tissue without affecting living tissue.

A PNEUMATIC TUBE SYSTEM with a "brain" has been developed by I.T.&T. Setting a dial on the carrier cartridge sends it to any of 40 receiving stations through a central switching system that works like an automatic phone exchange.

A HARVARD SCIENTIST challenges the belief that abnormalities at birth are caused mainly by heredity. His experiments with mice, reports Dr. Theodore H. Ingalls, point to prenatal environment--disease or injury suffered by the mother--as the reason why some children are born with such deformities as cleft palate, hare lip, club feet, and Mongolism.

HOUSEFLIES not only are becoming immune to DDT and other new insecticides--they're learning to avoid them. And these habits, says the U.S. Dept. of Agriculture, appear to be passed on to succeeding generations, even though the youngsters have never encountered the poisons.

INVENTIONS: A machine that can discriminate between speech and music has been developed by Dr. R. Clark Jones of the Polaroid Corp. It is a small 4-tube device that detects the pauses, which are more abrupt in speaking in singing. It will shut a radio off automatically when the music stops and someone starts to talk. . . . A MAN IN MISSOURI has patented a harness to keep peoples' mouths shut when sleeping, and so prevent snoring.

NEW PRODUCTS: Plasticloth, a waterproof plastic sheeting, makes handy drop cloths to protect furniture and floors during painting: dried drippings shake right off. . . . Using nylon, Underwood gets an extra four yards of typewriter ribbon on a spool. . . . Carilloy steel, developed by Carnegie-Illinois, stays tough even below zero. It's expected to save weight in military and road-building machines.

The Editors

Amazing New SAFETY SAW BLADE

Embodying a radically new cutting principle

Here is the greatest improvement in circular sawing — since the invention of the circular saw. It's the sensational new *P T I Cut Control* Saw Blade that brings long-needed safety and remarkable *new* efficiency to this important power tool. Never before has a saw blade been subjected to such gruelling, thorough tests, to such careful checking and re-checking by leading laboratories, government agencies, universities, and industrial concerns. And never before has a saw blade made such astounding records in safety and cutting efficiency. No other saw blade today can offer you so many exclusive advantages, including:

1. **Complete Safety From "Kick-Backs"** — Since the teeth are only 20/1000" high — they cannot grab the wood and throw it against the operator — eliminating one of the most serious causes of circular saw injuries.
2. **Reduced Direct Injuries** — Cut Control teeth do not drag the hand into the saw. The non-cutting edge acts as an effective stop to cuts and limits their depth.
3. **Cuts Chips — Not Sawdust** — unique cutting action produces chips. Easier to clean. Eliminates fire hazard of spontaneous combustion.
4. **30% to 40% Power Saving** — Fewer teeth mean fewer cuts to achieve same results — hence less power consumption.
5. **Longer Life Without Sharpening** — When cutting off chips — the wedge action of the tooth does most of the work — which means less wear on the cutting edge of the teeth.
6. **More Efficient Cutting** — Each tooth is backed up better against body of blade. It is therefore more rigid, less likely to vibrate — and cuts more smoothly.
7. **Quieter Running** — Fewer teeth makes saw practically noiseless when running true.
8. **Blade Does Not Crack** — blades are made of special Vanadium Steel. In addition — controlling of cut prevents overloading of teeth, a common cause of blade cracking.

ORDER TODAY —

SATISFACTION GUARANTEED!

Here are the prices and sizes, delivered, postpaid. All blades are combination rip and cross cut.

7" diameter blade	$4.95
8" diameter blade	5.90
10" diameter blade	7.50
12" diameter blade	9.40
14" diameter blade	11.40
16" diameter blade	14.40

(Prices on carbide tipped blades furnished on request.) In ordering, be sure to give the *diameter* and *bore* of the blade. Send check or money order or we will ship C.O.D. *Satisfaction or money back guaranteed.*

TESTED AND APPROVED

Actual letters from delighted users in America and Europe crowd our files. Excerpts from letters include:

"Your claims are confirmed by our tests. Power reduced by about 1/3. No heating of blade in spite of very exacting work. Confirm your observations regarding kick-back safety. Saw offers considerable advantages."

"Blade used on portable saw. Has properties like no other saw blade. Work is easier, faster and free of kick-backs. Less noise. Less power required."

"This saw was installed in February of this year on a G. M. Diehl Chain Feed Rip Saw and has had a total of 2,037 operating hours. During its entire operation the saw has produced a quality cut suitable for edge gluing."

PTI

PTI Incorporated, Dept. PS-1
401 Broadway, New York 13, N. Y.
Gentlemen: Rush me the following units:

Quantity	Blade Diameter	Blade Bore

Please check:

☐ Money order or check for $..... ☐ Send C.O.D.

Name .....

Address .....

City..... Zone..... State.....

TOP 3 FOR YOUR SHOP

9" MODEL A BENCH LATHE

3-ft. bed length with 12-speed horizontal drive, 1/2 h. p. motor and switch.

Time Payments: $94.00 down, $24.82 for 12 months **$375.00***

(Other models as low as $176.00)

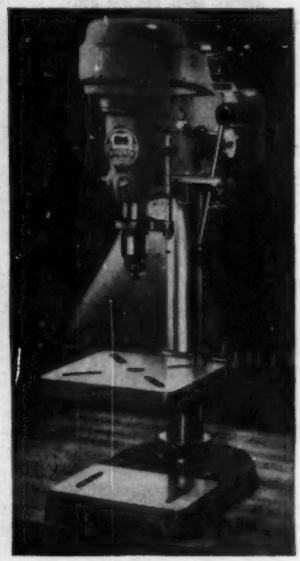
★

These South Bend machine tools make a perfect combination for any shop. They are quality-built throughout to give you greater accuracy and long, dependable service. You'll find them very easy to operate and adaptable to wide varieties of work. This combination will enable you to turn out work of the highest quality in your own shop.

South Bend machine tools are the *top buys* every time—you get more for your money.

Write today for literature.

*All prices f.o.b. factory



14" DRILL PRESS

Bench model with chuck, built-in light, 1/3 h. p. motor, and switches.

Time Payments: $36.00 down, $9.36 for 12 mos. **$142.00***

(Floor model also available)

★ ★

7" BENCH SHAPER

Price includes vise, light, switches and drive unit with 1/3 h. p. motor.

Time Payments: $126.05 down, $33.39 for 12 mos. **$504.05***

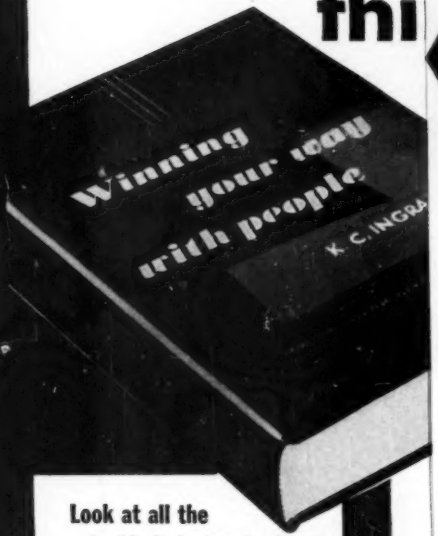
(Steel stand $137.50 extra)

SOUTH BEND LATHE WORKS

BUILDING BETTER TOOLS SINCE 1906 • • SOUTH BEND 22, INDIANA

How to

thi



Look at all the valuable "winning tips" you get in this big FREE book... that you can put to work right away!

- How to Get Ideas Across to People
- How to Build a Winning Personality
- How to Win People's Help in Business
- How to Make a Speech and Feel No Pain
- How to Help the Customer Buy
- How to Come Out of Your Shell
- How to Be Happy Though Married
- How to Turn Your Mistakes into Assets
- The "Just-as-I-Am" Complex
- How People Will Pay You Back
- Your Letter is You Speaking
- Personal Television by Telephone
- The Importance of Being Important
- How to Keep from Hating People
- How the Supervisor Gets Results Through Leadership
- How to Let Habits Work for You

FREE

Your Success Depends On Your Ability To Win Others to Your Way of Thinking—Here is a Proven Method for Achieving the Goals You Desire!

In simple language, "Winning Your Way With People" shows you how to put your ideas across, how to think on your feet, how to make better speeches, write more compelling letters, how to gain poise and confidence, increase your all-around selling efficiency. See inside for complete details of this FREE offer.

SEND NO MONEY FOR YOUR FREE COPY OF "WINNING YOUR WAY WITH PEOPLE"

Clip here—mail today! No stamp needed

Postage Will be Paid by Addressee

BUSINESS REPLY CARD

First Class Permit No. 40999, Sec. 34.9, P. L. & R., New York, New York

EXECUTIVE BOOKS, DEPT. 128
100 SIXTH AVENUE
NEW YORK 13, N. Y.

No Postage Stamp Necessary if Mailed in the United States

TOP

9" MODEL A BENCH LATHE

★

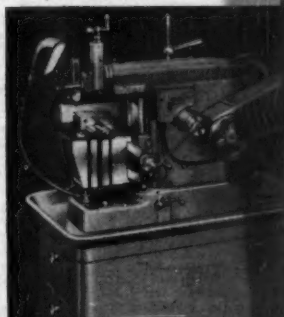
These South Bend machine tools make a perfect combination for any shop. They are quality-built throughout to give you greater accuracy and long, dependable service. You'll find them very easy to operate and adaptable to wide varieties of work. This combination will enable you to turn out work of the highest quality in your own shop.

South Bend machine tools are the *top buys* every time—you get more for your money.

Write today for literature.

*All prices f.o.b. factory

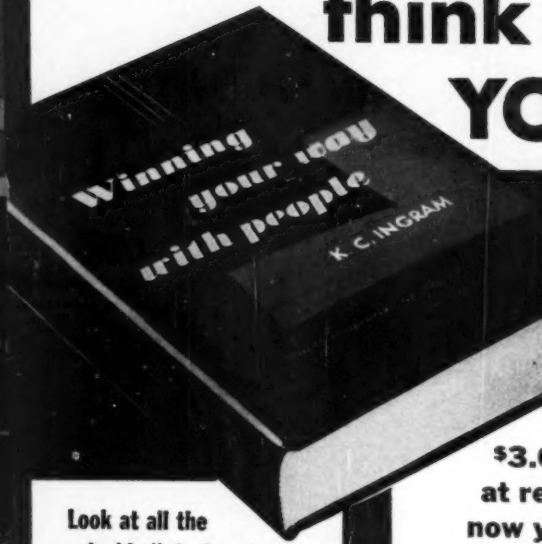
3-ft. bed length with 12-speed l
tal drive, 1/2 h. p. motor and
Time Payments: $94.00 down,
$24.82 for 12 months $3
(Other models as low as $17



SOUTH BEND L

BUILDING BETTER TOOLS SINCE 1906

How to ma think YO



Look at all the valuable "winning tips" you get in this big FREE book... that you can put to work right away!

- How to Get Ideas Across to People
- How to Build a Winning Personality
- How to Win People's Help in Business
- How to Make a Speech and Feel No Pain
- How to Help the Customer Buy
- How to Come Out of Your Shell
- How to Be Happy Though Married
- How to Turn Your Mistakes into Assets
- The "Just-as-I-Am" Complex
- How People Will Pay You Back
- Your Letter is You Speaking
- Personal Television by Telephone
- The Importance of Being Important
- How to Keep from Hating People
- How the Supervisor Gets Results Through Leadership
- How to Let Habits Work for You

$3.
at re
now y

FR

Why you a

The answer i
"Winning You
ple" FREE a
to Executive
man Lewis' "
Easy" (descril
first selection
examination t
Executive Bo
for men and
up the ladder
to show you
(and kind of
regularly as a
Each month
selects an outs
deals with kr

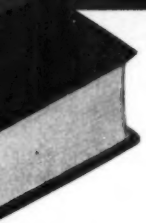
For

"We

Those who can
their ability to
get the "big m
you how, in th
rich, effective,
Lewis gives yo
their various fo
nunciation, and
though the aver
in an entire ye
that many in O
$3.95. Member

EXECUTIV

ake people listen to YOU...
k well of YOU...agree with
OU...and remember YOU!



$3.00
t retail
w yours
REE

JOHN D. ROCKEFELLER ONCE SAID: "I will pay more for the ability to deal with people than for any other ability under the sun."

A group of top executives recently put "ability to handle people" above technical skill, capacity for decision and any other personal quality which contributed to their success.

Yes—the one *success secret* upon which every authority agrees is the ability to influence and direct the efforts of others. And "Winning Your Way With People" – the practical, proven guide to handling people – is yours FREE when you mail attached gift card.

Top salaries are paid to those who have the ability to influence and direct the efforts of others. Mediocre jobs, failure to achieve one's rightful station in life, and a colorless, indifferent social existence practically always "trademark" people who do not understand how to get along with those who work with them or for them, or with those who come into contact with them after business hours.

Here, at last, is a guide to handling people successfully. K. C. Ingram reveals the psychology of making people *listen* to you, *think well* of you, *agree* with you and *remember* you.

Few men have ever earned $10,000, $25,000, or $50,000 a year with their own hands or even with just their own heads. Ideas and work are not enough! Men are paid according to their ability to manage others! "Winning Your Way With People" helps you to apply the principles of successful human relations worked out by actual experience. And this big best-seller—$3.00 at retail—is yours FREE when you mail attached gift card.

ou are being given this amazing FREE offer—

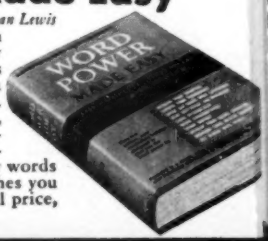
wer is simple. You get g Your Way With Peo- EE as a new subscriber utive Books, plus Nor- vis' "Word Power Made lescribed below) as your ection for 7-day FREE tion to introduce you to ve Books' proven plan and women on the way adder of success . . . and you the kind of books nd of savings) you get y as a subscriber.

month, Executive Books n outstanding book that ith knowledge essential to your success . . . *practical, helpful* information to speed you up the ladder of success. Each month, you will receive, as a subscriber, a *free* copy of our report, "The Executive," describing the forthcoming month's selection. You are *not* obligated to take every month's selection. You can take as few as four selections a year and still retain all the privileges and savings to which you are entitled as a subscriber. *Send no money!* Mail gift card now! Remember, you risk nothing because you may have both books for 7-day FREE examination.

For Your First Executive Book Selection, You Get

Word Power Made Easy"

Big 457-page book by Norman Lewis



ho can move men to action through lity to speak and write convincingly big money." Norman Lewis shows , in three short weeks, to build a ective, permanent vocabulary. Mr. ves you the meaning behind words, ious forms and spelling, their pro- on, and how they can be used. Al- he average adult learns only 50 new words tire year, Mr. Lewis' schedule teaches you y in ONE HOUR! Publisher's retail price, lembers' price, $3.50.

UTIVE BOOKS, 100 SIXTH AVE., NEW YORK 13, N.Y.

Clip here—mail today!
No stamp needed

Send no money! Mail gift card for your

FREE

copy of K. C. Ingram's great book,

"Winning Your Way With People"

as a New Subscriber

★ ★ ★

EXECUTIVE BOOKS, DEPT. 128
100 Sixth Avenue, New York 13, N. Y.

I want to take advantage of your gift offer to send me FREE K. C. Ingram's great book, "Winning Your Way With People," together with "Word Power Made Easy" by Norman Lewis, as my first selection, for the members' price of only $3.50.

At the end of 7 days' free trial, I will either return both books and you will cancel my subscription or I will send you the price of my first selection plus a few cents for shipping. Then you are to send me each month *free* a copy of "The Executive," describing the forthcoming selection so that I can accept or reject it as I choose. My only obligation is to purchase as few as four Executive Books within the coming twelve months.

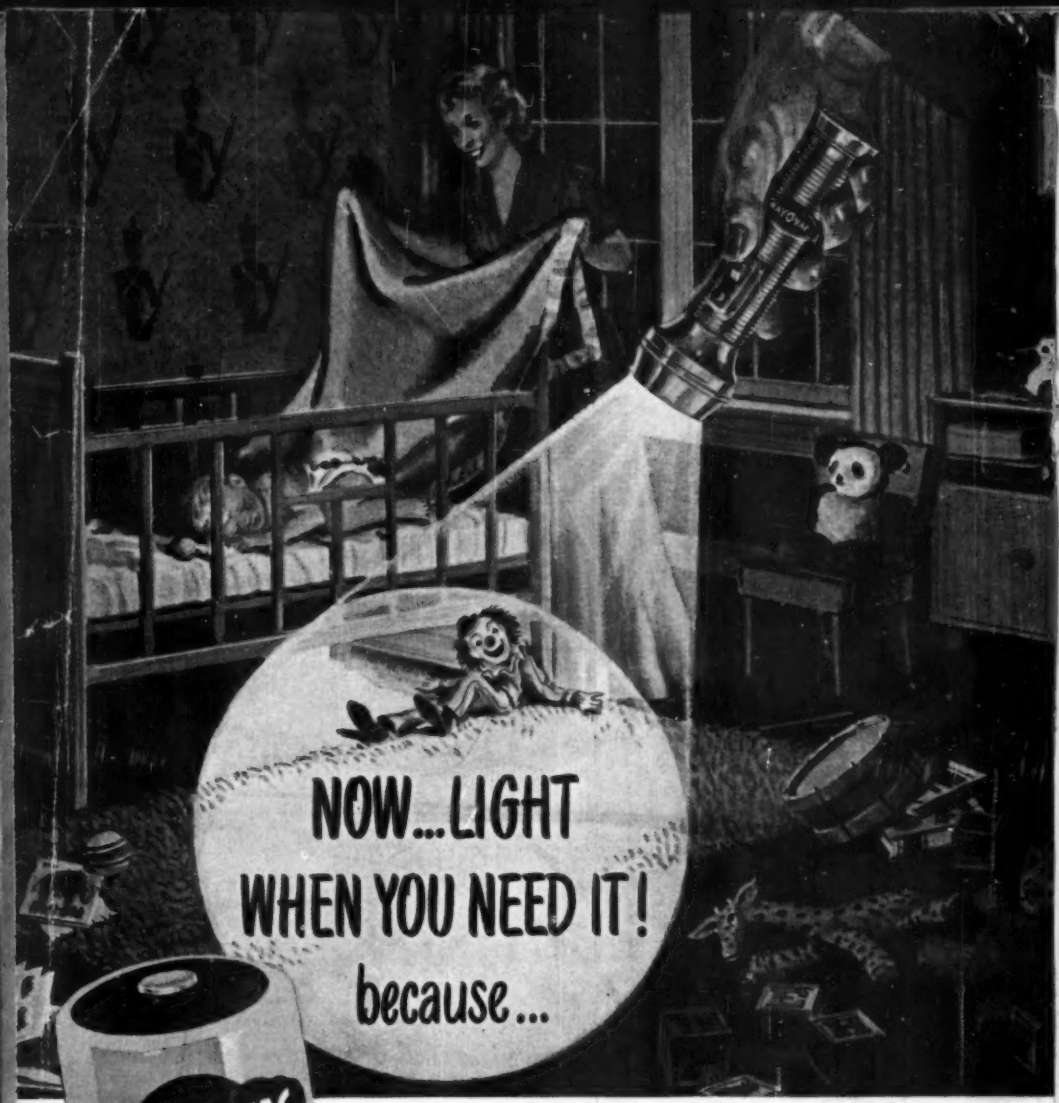
NAME _____
(Please Print Plainly)

ADDRESS _____

CITY _____ STATE _____
(Zone No. if any)

EMPLOYER _____

(Same price in Canada. Address Owen Sound, Ont.) PS-1



They're sealed in steel

to stay fresh and usable!

Above, new Ray-O-Vac "Billioneer" 2-cell flashlight . . . now at your favorite dealer.

Here's the battery that won't swell or stick in your flashlight . . . that will stay fresh and usable longer . . . that doesn't have to be "dated." Only genuine Ray-O-Vacs are sealed in steel . . . top, bottom, and all around. You get . . .

1. A steel top.
2. Powerful battery.
3. Multi-ply insulation.
4. Steel jacket.
5. Steel bottom.

Each battery carries this guarantee: "If your flashlight is damaged by corrosion, leakage or swelling of this battery, send it to us with the batteries and we will give you FREE a new, comparable flashlight with batteries."

Over a Billion Sold

© 1950 BY RAY-O-VAC COMPANY, MADISON, WIS.
RAY-O-VAC CANADA, LTD., WINNIPEG, MAN.

Buy Spares... *they stay fresh*